Peripheral Interface Guide

Service Guide

December 1992

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Peripheral Interface Guide

Introduction

Welcome to the ninth edition of the Apple® Peripheral Interface Guide.

This guide contains interface information--pin-outs, switch settings, cabling requirements, and diagrams of interface ports--for Apple computers, interface cards, and peripherals. This information will help you connect Apple and non-Apple peripherals to Apple computers. The information will also be useful in troubleshooting situations where interface problems may be involved.

The Peripheral Interface Guide contains the following information:

Macintosh, Apple II, Apple III, & Lisa/Macintosh XL Computers

The first three sections contain the specifications for all built-in interface and interface card connectors for the Macintosh, Apple II, Apple III, and Lisa/Macintosh XL families of computers. Each section covers built-in interfaces first, followed by interface cards. Illustrations at the beginning of each section show the locations of the built-in interface connectors. The guide contains pin numbers, signal mnemonics, signal descriptions, and connector types for all connectors. For interface cards that contain option switches, a table lists the functions of the switches and how they should be set to produce various operating characteristics. Any special information related to an interface is noted. Peripheral connection tables at the end of each section indicate cable requirements for connecting compatible peripherals to each computer.

Peripherals

This section covers Apple peripheral devices. Devices are arranged by category--Laser Printers, Non-Laser Printers, Modems and Communications, and Miscellaneous. The pin numbers, signal mnemonics, signal descriptions, and connector types are listed for each device. Option switch functions and settings are listed, with the default (factory) settings shown in bold type.

Cables

Apple peripheral cables with their pin connections are included here. Each cable chart lists the devices that can be connected with that cable. This section also includes diagrams of the various connectors used.

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Introduction

This section contains the specifications for all the built-in interfaces and interface card connectors for the Macintosh family of computers. Built-in interfaces are covered first, followed by interface cards. Illustrations at the beginning of the section show the locations of the built-in interface connectors.

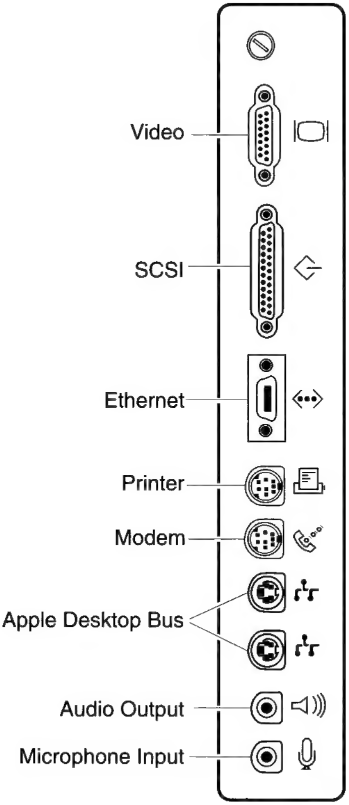
Notes:
A slash (/) after the signal name indicates that the signal is valid when the signal is low.

The connector specified is for the cable end, not the computer port.

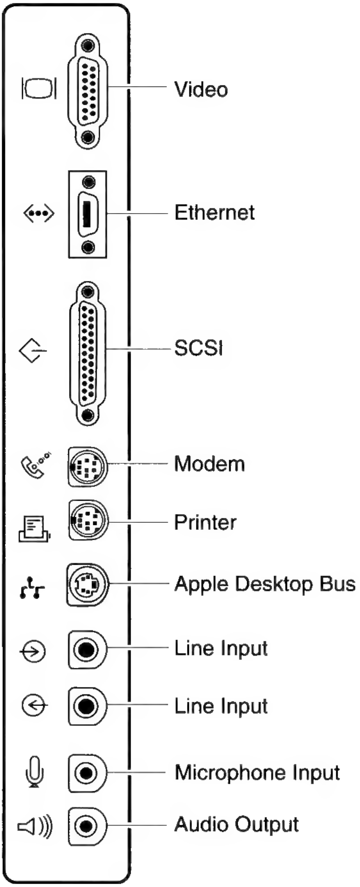
In the peripheral connections tables, accessory kit part numbers followed by an asterisk (*) include items in addition to the cable (software and/or manuals, for example).

Computer Port Locations

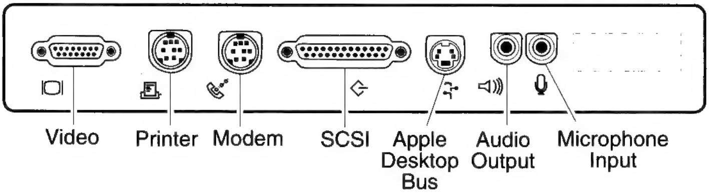
Macintosh Quadra 700


Video
SCSI
Ethernet
Printer
Modem
Apple Desktop Bus
Audio Output
Microphone Input

Macintosh Quadra 900/950


Video
Ethernet
SCSI
Modem
Printer
Apple Desktop Bus
Line Input
Line Input
Microphone Input
Audio Output

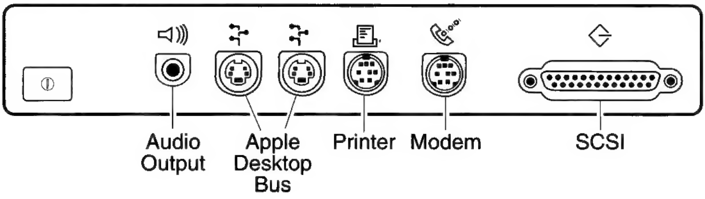
Macintosh LC / LC II / Performa 400


Video
Printer
Modem
SCSI
Apple Desktop Bus
Audio Output
Microphone Input

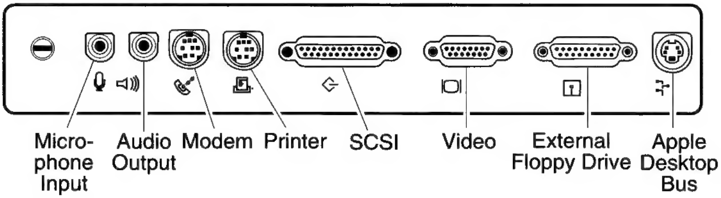
Macintosh Family Computers

Computer Port Locations

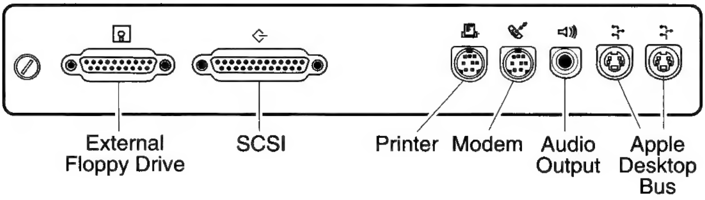
Macintosh II, IIx, IIfx


Audio Output
Apple Desktop Bus
Printer
Modem
SCSI

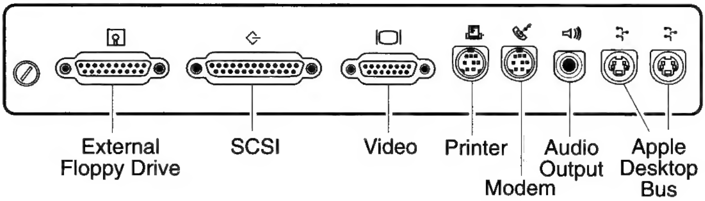
Macintosh IIsi


Micro-phone Input
Audio Output
Modem
Printer
SCSI
Video
External Floppy Drive
Apple Desktop Bus

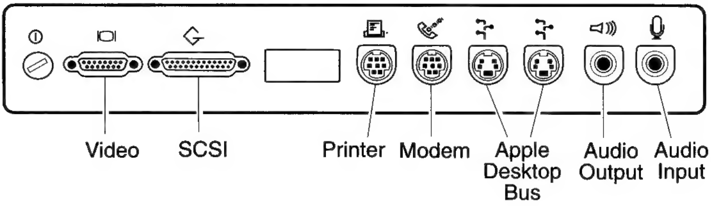
Macintosh IIcx


External Floppy Drive
SCSI
Printer
Modem
Audio Output
Apple Desktop Bus

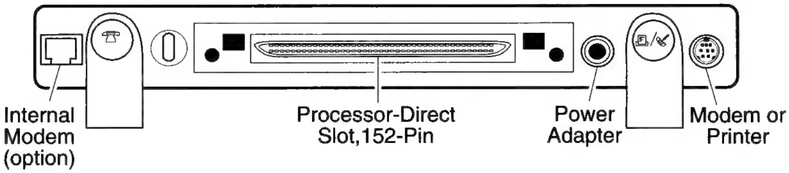
Macintosh IIci


External Floppy Drive
SCSI
Video
Printer
Modem
Audio Output
Apple Desktop Bus

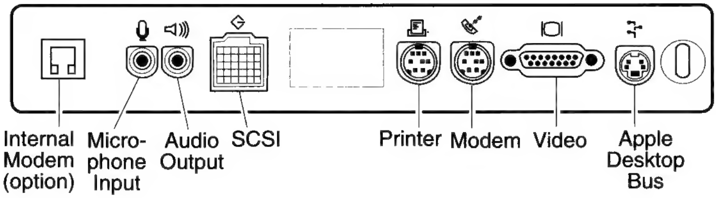
Macintosh IIvi/ IIvx/ Performa 600


Video
SCSI
Printer
Modem
Apple Desktop Bus
Audio Output
Audio Input

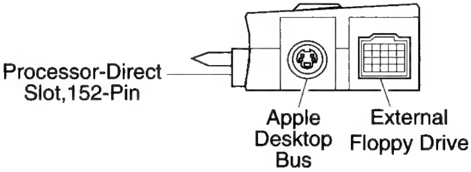
Powerbook Duo 210/230


Internal Modem (option)
Processor-Direct Slot,152-Pin
Power Adapter
Modem or Printer

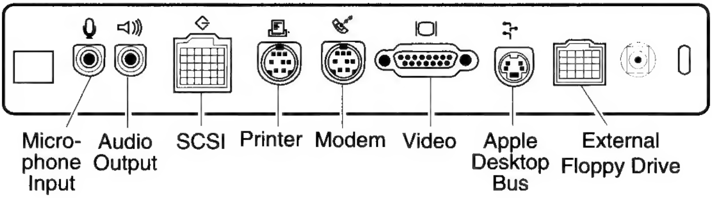
Macintosh Duo Dock


Internal Modem (option)
Micro-phone Input
Audio Output
SCSI
Printer
Modem
Video
Apple Desktop Bus

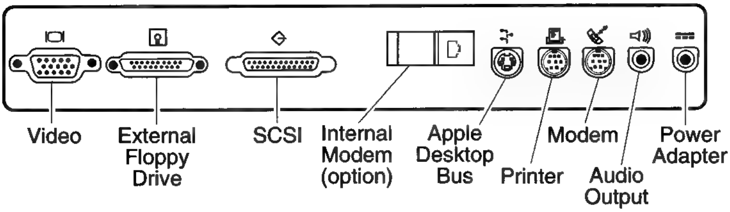
Macintosh PowerBook Floppy Adapter


Processor-Direct Slot,152-Pin
Apple Desktop Bus
External Floppy Drive

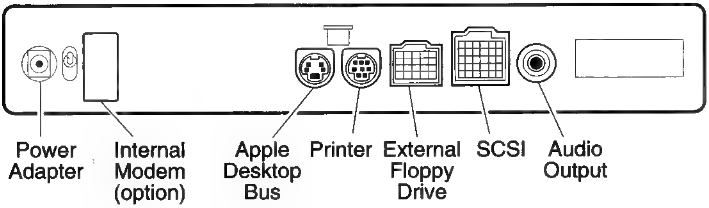
Macintosh Duo MiniDock


Micro-phone Input
Audio Output
SCSI
Printer
Modem
Video
Apple Desktop Bus
External Floppy Drive

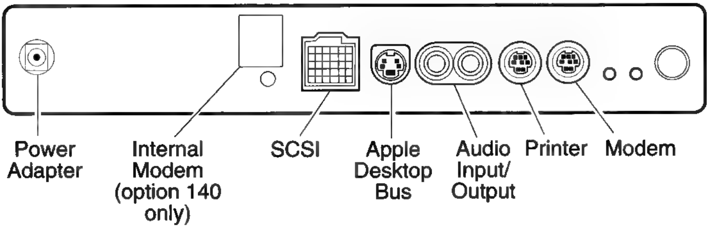
Macintosh Portable


Video
External Floppy Drive
SCSI
Internal Modem (option)
Apple Desktop Bus
Printer
Modem
Audio Output
Power Adapter

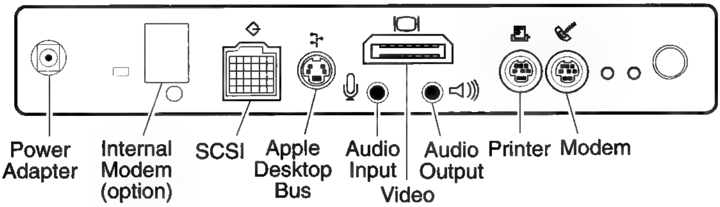
PowerBook 100


Power Adapter
Internal Modem (option)
Apple Desktop Bus
Printer
External Floppy Drive
SCSI
Audio Output

PowerBook 140/145/170


Power Adapter
Internal Modem (option 140 only)
SCSI
Apple Desktop Bus
Audio Input/ Output
Printer
Modem

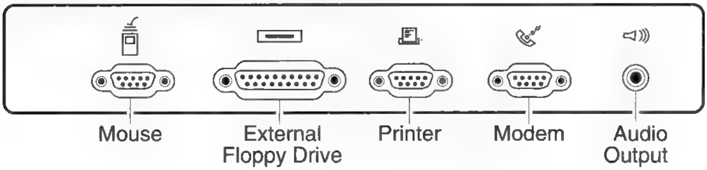
PowerBook 160/180


Power Adapter
Internal Modem (option)
SCSI
Apple Desktop Bus
Audio Input
Video
Audio Output
Printer
Modem

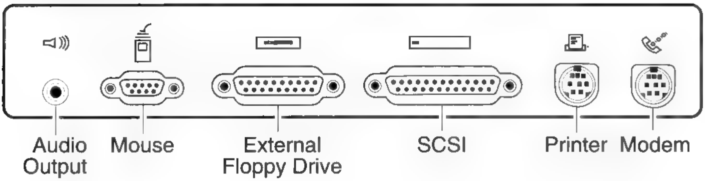
Macintosh Family Computers

Computer Port Locations

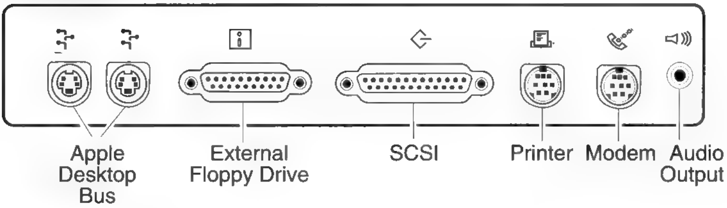
Macintosh 128K, 512K, 512K enhanced


Mouse
External Floppy Drive
Printer
Modem
Audio Output

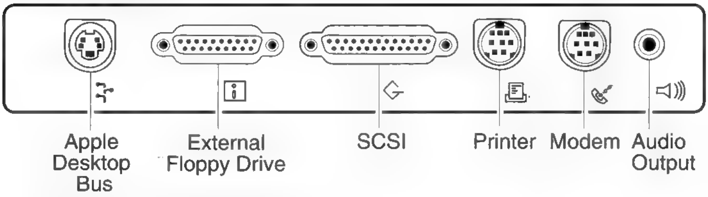
Macintosh Plus


Audio Output
Mouse
External Floppy Drive
SCSI
Printer
Modem

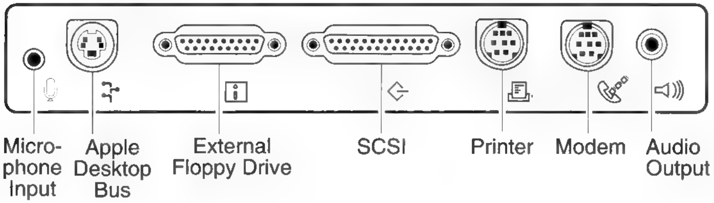
Macintosh SE & SE/30


Apple Desktop Bus
External Floppy Drive
SCSI
Printer
Modem
Audio Output

Macintosh Classic


Apple Desktop Bus
External Floppy Drive
SCSI
Printer
Modem
Audio Output

Macintosh Classic II / Performa 200


Microphone Input
Apple Desktop Bus
External Floppy Drive
SCSI
Printer
Modem
Audio Output

External Video Connector

Pin	Signal Name	Signal Description
1	RED.GND	Red video ground
2	RED.VID	Red video
3	CSYNC/	Composite sync
4	MON.ID1	Monitor ID, bit 1
5	GRN.VID	Green video
6	GRN.GND	Green video ground
7	MON.ID2	Monitor ID, bit 2
8	NC	No connection
9	BLU.VID	Blue video
10	MON.ID3	Monitor ID, bit 3
11	C&VSYNC GND	Composite & vertical sync ground
12	VSYNC/	Vertical sync
13	BLU.GND	Blue video ground
14	HSYNC.GND	Horizontal sync ground
15	HSYNC/	Horizontal sync
Shell	CHASSIS GND	Chassis ground

Connector type: DA-15 male

This connector is present on the Macintosh LC, LC II/Performa 400, IIci, IIsi, Quadra 700, Quadra 900/950, Macintosh Duo Dock, and Duo MiniDock.

The Macintosh Quadra 700 and Quadra 900/950 support all Apple-manufactured Macintosh monitors.

The Macintosh LC, LC II/Performa 400, IIvi, IIvx, and Performa 600 support all Apple-manufactured 12- and 13-inch monochrome and color monitors.

The Macintosh IIci and IIsi support all Apple-manufactured Macintosh monitors except the Macintosh Portrait Display, 21-Inch Color Display, and Two-Page Monochrome Monitor.

The PowerBook 160, 180, Duo Dock, and Duo MiniDock support all Apple-manufactured monitors, except the 21-Inch Color Display and Two-Page Monochrome Monitor.

External Video Connector – PowerBook 160/180

Pin	Signal Name	Signal Description
1	RED.VID	Red video
2	RED.GND	Red video ground
3	MON.ID1	Monitor ID, bit 1
4	VSYNC/	Vertical sync
5	CSYNC/	Composite sync
6	C&VSYNC.GND	Composite & vertical sync ground
7	GRN.GND	Green video ground
8	GRN.VID	Green video
9	MON.ID2	Monitor ID, bit 2
10	HSYNC.GND	Horizontal sync ground
11	MON.ID3	Monitor ID, bit 3
12	HSYNC/	Horizontal sync
13	BLU.VID	Blue video
14	BLU.GND	Blue video ground
Shell	CHASSIS GND	Chassis ground

Connector type: 14-pin high-density, female

This connector is present on the PowerBook 160 and 180.

All Apple-manufactured Macintosh monitors except the 21-Inch Color Display and Two-Page Monochrome Monitor are supported.

External Video Connector – Macintosh Portable

Pin	Signal Name	Signal Description
1	FPDATA(0)	Flat panel display data bus (bit 0)
2	FPDATA(1)	Flat panel display data bus (bit 1)
3	+5V	+5 volts DC
4	FPDATA(2)	Flat panel display data bus (bit 2)
5	FPDATA(3)	Flat panel display data bus (bit 3)
6	FPDATA(4)	Flat panel display data bus (bit 4)
7	GND	Ground
8	+5V	+5 volts DC
9	GND	Ground
10	FPDATA(5)	Flat panel display data bus (bit 5)
11	FPDATA(6)	Flat panel display data bus (bit 6)
12	FPDATA(7)	Flat panel display data bus (bit 7)
13	BATTVOLTAGE	Direct connect to main battery
14	FLM	Flat panel new frame sync
15	CL2/	Flat panel display data clock

Connector type: 15-pin, high-density, D-shaped male

Modem and Printer Connectors – Mini DIN-8

Pin	Signal Name	Signal Description
1	HSKo	Handshake output; connected to SCC Data Terminal Ready
2	HSKi	Handshake input; connected to SCC Clear To Send and Transmit/Receive Clock
3	TxD-	Transmit Data (inverted); connected to SCC Transmit Data; tri-stated when Request To Send is deasserted
4	SG	Signal Ground; connected to logic and chassis ground
5	RxD-	Receive Data (inverted); connected to SCC Receive Data
6	TxD+	Transmit Data; connected to SCC Transmit Data; tri-stated when Request To Send is deasserted
7†	GPi	General-Purpose input; connected to SCC Data Carrier Detect.
8	RxD+	Receive Data; connected to SCC Receive Data

Connector type: Mini DIN-8 male

This connector is present on all Macintosh computers except the 128K, 512K, and 512K enhanced.

To connect DE-9 cables to the Mini DIN-8 port, use adapter cable 590-0341 (beige) or 590-0553/699-0430 (smoke).

† On serial port A (modem), if the VIA1 SYNC signal is high, this input will be routed to the receive/transmit clock input of the SCC. This clock input supports high-speed synchronous devices. Pin 7 is not connected on the Macintosh Plus, LC, or IIsi.

Modem and Printer Connectors – DE-9

Pin	Signal Name	Signal Description
1	GND FG	Signal ground Frame ground
2	+5V NC	+5 volts No connection
3	GND SG	Signal ground Signal ground
4	TXD+ NC	Transmit Data + No connection
5	TXD- TXD	Transmit Data - Transmit Data
6	+12V NC	+12 volts No connection
7[†]	HSKi NC	Handshake input No connection
8[&]	RXD+ NC	Receive Data + No connection
9	RXD- RXD	Receive Data - Receive Data

Connector type: DE-9 male

This connector is present on the Macintosh 128K, 512K, and 512K enhanced.

The upper set of signal names and descriptions listed applies to RS-422. The lower set applies to RS-232.

[†] When connecting to an RS-232 device, use HSKi with data set ready (DSR) or other handshaking signals, depending on the device to be connected.

[&] When connecting to an RS-232 device, connect pin 8 to pin 3 (ground).

SCSI Connector – DB-25
(Pins 1-12)

Pin	Signal Name	Signal Description
1	REQ/	Request
2	MSG/	Message
3	I/O/	Input/output
4	RST/	Reset
5	ACK/	Acknowledge
6	BUSY/	Busy
7	GND	Signal ground
8	Data0/	Data bit 0
9	GND	Signal ground
10	Data3/	Data bit 3
11	Data5/	Data bit 5
12	Data6/	Data bit 6

SCSI Connector – DB-25
(Pins 13-25)

Pin	Signal Name	Signal Description
13	Data7/	Data bit 7
14	GND	Signal ground
15	C/D/	Control/data
16	GND	Signal ground
17	ATN/	Attention
18	GND	Signal ground
19	SEL/	Select
20	PARITY/	Data parity
21	Data1/	Data bit 1
22	Data2/	Data bit 2
23	Data4/	Data bit 4
24	GND	Signal ground
25†	TERMPWR	+5 volts terminator power

Connector type: DB-25 male

This connector is present on all Macintosh computers (including the Duo Dock) except the 128K, 512K, 512K enhanced, and PowerBook series.

Total length of cables should not exceed 20 feet (6 meters).

CAUTION: This interface uses the same type of connector as a standard RS-232 serial interface, but is electrically very different. DO NOT connect RS-232 devices or cables to this port. Doing so can damage the device and the computer.

† Terminator power is not provided on the Macintosh Plus or Portable.

SCSI Connector – HDI-30
(Pins 1-15)

Pin	Signal Name	Signal Description
1	SCSI–Mode/	SCSI disk mode enable signal
2	Data0/	Data bit 0
3	GND	Signal ground
4	Data1/	Data bit 1
5†	Termpwr	+5 volts termination power
6	Data2/	Data bit 2
7	Data3/	Data bit 3
8	GND	Signal ground
9	ACK/	Acknowledge
10	GND	Signal ground
11	Data4/	Data bit 4
12	GND	Signal ground
13	GND	Signal ground
14	Data5/	Data bit 5
15	GND	Signal ground

† Termination power is not provided on the PowerBook 100.

SCSI Connector – HDI-30
(Pins 16-30)

Pin	Signal Name	Signal Description
16	Data6/	Data bit 6
17	GND	Signal ground
18	Data7/	Data bit 7
19	PARITY/	Data parity
20	GND	Signal ground
21	REQ/	Request
22	GND	Signal ground
23	BUSY/	Busy
24	GND	Signal ground
25	ATN/	Attention
26	C/D/	Control/data
27	RST/	Reset
28	MSG/	Message
29	SEL/	Select
30	I/O/	Input/output

Connector: 30-pin high-density interconnect (HDI-30)

This connector is present on the Macintosh PowerBook series (except the Duo 210/230). This connector is not present on the Macintosh Duo Dock or Macintosh Duo MiniDock.

Computer Ports

Apple Desktop Bus Connector

Pin	Signal Name	Signal Description
1	Data	Bidirectional data bus
2†	Power On/	Signal momentarily grounded to pin 4 to begin power-up sequence in CPU
3	Power	+5 volts
4	Ground	Signal Ground

Connector type: Mini DIN-4 male

This connector is present on all Macintosh computers except the 128K, 512K, 512K enhanced, and Plus.

Total length of all cables should not exceed 16 feet (5 meters).

† On the Macintosh II family; Quadra 700 and 900; and PowerBook series only. Pin 2 is unused on all other models.

Mouse Connector

Pin	Signal Name	Signal Description
1	GND	Signal ground
2	+5V	+5 volts DC
3	GND	Signal ground
4	X2	Left-to-right motion indicator
5	X1	Interrupt line (left-to-right motion)
6	NC	No connection
7	SW	Mouse button
8	Y2	Up-down motion indicator
9	Y1	Interrupt line (up-down motion)

Connector type: DE-9 male

This connector is present on the Macintosh 128K, 512K, 512K enhanced, and Plus.

Computer Ports

Keyboard Connector

Pin	Signal Name	Signal Description
1	GND	Ground
2	CLOCK	Keyboard clock (input to VIA)
3	DATA	Serial data line
4	+5V	+5 volts

Connector type: RJ-11

This connector is present on the Macintosh 128K, 512K, 512K enhanced, and Plus.

Ethernet Connector

Pin	Signal Name	Signal Description
1	FN Pwr	+12 volts @ 175 mA or +5 volts @ 420 mA
2	DI-A	Data In circuit A
3	DI-B	Data In circuit B
4	VCC	Voltage common
5	CI-A	Control In circuit A
6	CI-B	Control In circuit B
7	+5V	+5 volts (from host)
8	+5V	Secondary +5 volts (from host)
9	DO-A	Data Out circuit A
10	DO-B	Data Out circuit B
11	VCC	Secondary voltage common
12	NC	Reserved
13	NC	Reserved
14	FN Pwr	Secondary +12 volts or +5 volts
Shell	Protective Gnd	Protective ground

Connector type: Custom 14-pin .05" spaced ribbon

This connector is present on the Macintosh Quadra 700 and Quadra 900.

External Floppy Drive
Connector – DB-19

Pin	Signal Name	Signal Description
1	GND	Signal ground
2	GND	Signal ground
3	GND	Signal ground
4	GND	Signal ground
5	-12V	-12 volts DC
6	+5V	+5 volts DC
7	+12V	+12 volts DC
8	+12V	+12 volts DC
9	NC	No connection
10	PWM	Motor speed control
11	PH0	Command control line
12	PH1	Command control line
13	PH2	Command control line
14	PH3	Command control line
15	WRREQ/	Write request
16	HDSEL	Head select
17	ENBL2/	Read line enable
18	RD	Read data
19	WR	Write data

Connector type: DB-19 male

This connector is present on the Macintosh 128K, 512K, 512K enhanced, Plus, SE, SE/30, Classic, Classic II/Performa 200, Portable, IIcx, IIci, IIsi, and IIvi/IIvx/Performa 600.

A Macintosh 400K External Drive can be connected to the Macintosh 128K, 512K, 512K enhanced, Plus, SE, and Portable.

A Macintosh 800K External Drive or an Apple 3.5 Drive can be connected to the Macintosh 512K enhanced, Plus, SE, SE/30, Classic, Classic II/Performa 200, IIcx, IIci, IIsi, Portable, and IIvi/IIvx/Performa 600.

Connect an Apple SuperDrive to a Macintosh SE (FDHD upgrade), SE/30, Classic, Classic II, IIcx, IIci, IIsi, Portable, and IIvi/IIvx/Performa 600.

Connect a Hard Disk 20 to a Macintosh 512K, 512K enhanced, Plus, and SE.

External Floppy Drive Connector – HDI-20

Pin	Signal Name	Signal Description
1	GND	Signal ground
2	GND	Signal ground
3	GND	Signal ground
4	GND	Signal ground
5	NC	No connection
6	+5V	+5 volts DC
7	+5V	+5 volts DC
8	+5V	+5 volts DC
9	+5V	+5 volts DC
10	NC	No connection
11	PH0	Phase 0
12	PH1	Phase 1
13	PH2	Phase 2
14	PH3	Phase 3
15	WREQ/	Write request
16	HDSEL	Head select
17	ENBL2/	External drive select
18	RD	Read data
19	WR	Write data
20	NC	Not connected

Connector: 20-pin high-density interconnect (HDI-20)

This connector is present on the Macintosh Duo MiniDock, PowerBook 100, and PowerBook Duo Floppy Adapter.

An HDI-20 1.4 MB Drive can be connected to this port.

Audio Output Connector – Stereo[†]

Pin	Signal Name	Signal Description
(Sleeve)	GND	Signal ground
(Tip)	Left	1-volt peak-to-peak audio signal with an impedance of 47 ohms[§]; left channel
(Ring)	Right	1-volt peak-to-peak audio signal with an impedance of 47 ohms; right channel

Connector type: Stereo miniature phone plug (3.6 mm)

This connector is present on the Macintosh SE/30, Classic, Classic II/Performa 200, II, IIx, IIfx, IIcx, IIci, Quadra 700, Quadra 900/950, LC, LC II/Performa 400 IIsi, Portable, and PowerBook series (except the Duo 210/230).

The internal speaker is disabled when this connector is in use.

[†] The PowerBook 100 outputs a monaural signal on the left and right channels.

[§] The Macintosh Portable and PowerBook series produce a 0.75-volt peak-to-peak signal.

Audio Output Connector – Monaural

Pin	Signal Name	Signal Description
(Tip)	AUDIO	.5-volt peak-to-peak audio signal
(Sleeve)	GND	Signal ground

Connector type: Monaural miniature phone plug (3.6 mm)

This connector is present on the Macintosh 128K, 512K, 512K enhanced, Plus, and SE.

The internal speaker is disabled when this connector is in use.

Computer Ports

Microphone Input Connector

Pin	Signal Name	Signal Description
(Tip)	+8V	+8 volts for powering electret microphone†
(Ring)	Right	Audio input with a maximum amplitude of 20 mV at 600 ohms impedance
(Sleeve)	GND	Signal ground

Connector type: Stereo miniature phone plug (3.6 mm)

This connector is present on the Macintosh LC, LC II/Performa 400, IIsi, Classic II/Performa 200, IIvi/IIvx/Performa 600, Quadra 700, Quadra 900/950, PowerBook 140, 145, 160, 170, 180, and Duo Dock.

† Do not connect any device other than the Macintosh microphone into the microphone input connector. The connector provides +8 volts for the microphone. Connecting incompatible devices could damage the device or computer.

Line Input Connectors

Pin	Signal Description	Pin	Signal Description
(Sleeve)	Digital ground	(Tip)	Audio input

Connector type: RCA phono plug

This connector is present on the Macintosh Quadra 900/950 only. Two connectors are provided—right and left channel. The stereo information will be internally mixed to yield a monaural signal.

Macintosh II High-Res Video Card, Macintosh II Extended High-Res Video Card, and Macintosh Display Cards 4•8, 8•24, and 8•24GC

Pin	Signal Name	Signal Description
1	RED.GND	Red video ground
2	RED.VID	Red video
3	CSYNC/	Composite sync
4	MON.ID1	Monitor ID, bit 1
5	GRN.VID	Green video
6	GRN.GND	Green video ground
7	MON.ID2	Monitor ID, bit 2
8	NC	No connection
9	BLU.VID	Blue video
10	MON.ID3	Monitor ID, bit 3
11	C&VSYNC GND	Composite & vertical sync ground
12	VSYNC/	Vertical sync
13	BLU.GND	Blue video ground
14	HSYNC.GND	Horizontal sync ground
15	HSYNC/	Horizontal sync
Shell	CHASSIS GND	Chassis ground

Connector type: DA-15 male

These cards support all present Apple-manufactured Macintosh monitors.

CAUTION: The signals on this connector are not the same as on the DA-15 of the Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card. DO NOT connect an Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card device or cable to any Macintosh video card.

Macintosh II Video Card (4- and 8-bit) and Monochrome Video Card (1-bit)

Pin	Signal Description	Pin	Signal Description
1	Red signal ground	9	Analog blue video
2	Analog red video	10	No connection
3	Composite sync	11	No connection
4	Sync signal ground	12	No connection
5	Analog green video	13	Blue signal ground
6	Green signal ground	14	No connection
7	No connection	15	No connection
8	No connection	(Shield)	Shield ground

Connector type: DA-15 male

CAUTION: The signals on this connector are not the same as on the DA-15 of the Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card. DO NOT connect an Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card device or cable to the Video or Monochrome Cards.

Macintosh II Portrait Video Card (newer version)

Pin	Signal Name	Signal Description
1	RED.GND	Red video ground
2	RED.VID	Red video
3	CSYNC/	Composite sync
4	MON.ID1	Monitor ID, bit 1
5	GRN.VID	Green video
6	GRN.GND	Green video ground
7	MON.ID2	Monitor ID, bit 2
8	NC	No connection
9	BLU.VID	Blue video
10	MON.ID3	Monitor ID, bit 3
11	C&VSYNC GND	Composite & vertical sync ground
12	VSYNC/	Vertical sync
13	BLU.GND	Blue video ground
14	HSYNC.GND	Horizontal sync ground
15	HSYNC/	Horizontal sync
Shell	CHASSIS GND	Chassis ground

Connector type: DA-15 male

CAUTION: The signals on this connector are not the same as on the DA-15 of the Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card. DO NOT connect an Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card device or cable to the Portrait Display or Two-Page Monochrome Monitor video card.

Macintosh II Portrait Video Card (older version) and Macintosh II Two-Page Monochrome Video Card

Pin	Signal Description
A1	Monochrome video
A2	No connection
A3	No connection
1	Horizontal sync return
2	Vertical sync
3	Sense #3
4	Sense ground
5	Composite sync
6	Horizontal sync
7	Vertical sync return
8	Sense #2
9	Sense #1
10	Composite sync return
Shell	Shell ground

Connector type: 13-pin, mixed-contact, D-type (Dartech FM-13W3S male or equivalent)

EtherTalk Interface Card and EtherTalk NB Card

Pin	Signal Description	Pin	Signal Description
1	Shield	9	Collision presence -
2	Collision presence +	10	Transmit -
3	Transmit +	11	Reserved
4	Reserved	12	Receive -
5	Receive +	13	Power
6	Power return	14	Reserved
7	Reserved	15	Reserved
8	Reserved		

Connector type: DA-15 male

This connector supports thick coaxial cable with the use of an optional transceiver (not available from Apple).

CAUTION: The signals on this connector are not the same as on the DA-15 of the Apple IIc, IIGS, IIII, III Plus, or Macintosh II video cards. DO NOT connect an Apple IIc, IIGS, III, III Plus, or Macintosh II video card device or cable to the EtherTalk Interface Card.

Apple TokenTalk NB Interface Card and Apple Token Ring 4/16 NB Card

Pin	Signal Description	Pin	Signal Description
1	Receive data	6	Receive data
2	No connection	7	No connection
3	No connection	8	No connection
4	No connection	9	Transmit data
5	Transmit data		

Connector type: DE-9 male

Apple Coax/Twinax Card and EtherTalk NB Card – Coax Connector

Pin	Signal Name	Signal Description
(Tip)	CX+	Transmit/receive data
(Sleeve)	CX-	Signal ground

Connector type: BNC male

Apple Coax/Twinax Card – Twinax Connector

Pin	Signal Description	Pin	Signal Description
1	No connection	9	No connection
2	No connection	10	No connection
3	No connection	11	No connection
4	No connection	12	No connection
5	No connection	13	No connection
6	No connection	14	"B" twinax signal
7	"A" twinax signal	15	No connection
8	No connection		

Connector type: DA-15 female

Apple Serial NB Card (Pins 1-20)

Pin	Signal Name	Signal Description
1	+CA1F	X.21 control, +CHA1, output
2	232TXDA1	Transmit data, CHA1, RS-232, output
3	-CA1F	X.21 control, -CHA1, output
4	1RTSA	Ready To Send, CHA1, RS-232, output
5	1CTSA	Clear To Send, CHA1, RS-232, input
6	+CB1F	X.21 control, +CHB1, output
7	232TXDB1	Transmit data, CHB1, RS-232, output
8	-CB1F	X.21 control, -CHB1, output
9	1RTSB	Ready To Send, CHB1, RS-232, output
10	1CTSB	Clear To Send, CHB1, RS-232, input
11	+IB1	X.21 indication, +CHB1, input
12	232TXDA2	Transmit data, CHA2, RS-232, output
13	2RXDA	Receive data, CHA2, RS-232, input
14	2RTSA	Ready To Send, CHA2, RS-232, output
15	2CTSA	Clear To Send, CHA2, RS-232, input
16	+IA1	X.21 indication, +CHA1, input
17	232TXDB2	Transmit data, CHB2, RS-232, output
18	2RXDB	Receive data, CHB2, RS-232, input
19	2RTSB	Ready To Send, CHB2, RS-232, output
20	2CTSB	Clear To Send, CHB2, RS-232, input

Apple Serial NB Card (Pins 21-40)

Pin	Signal Name	Signal Description
21	+422TXCA1	+Transmit clock, CHA1, RS-422, input
22	-422TXCA1	-Transmit clock, CHA1, RS-422, input
23	+422RXDA1	+Receive data, CHA1, RS-422, input
24	-422RXDA1	-Receive data, CHA1, RS-422, input
25	+422RXCA1	+Receive clock, CHA1, RS-422, input
26	-422RXCA1	-Receive clock, CHA1, RS-422, input
27	+422TXDA1	+Transmit data, CHA1, RS-422, output
28	-422TXDA1	-Transmit data, CHA1, RS-422, output
29	+422TXCB1	+Transmit clock, CHB1, RS-422, input
30	-422TXCB1	-Transmit clock, CHB1, RS-422, input
31	+422RXDB1	+Receive data, CHB1, RS-422, input
32	-422RXDB1	-Receive data, CHB1, RS-422, input
33	+422RXCB1	+Receive clock, CHB1, RS-422, input
34	-422RXCB1	-Receive clock, CHB1, RS-422, input
35	+422TXDB1	+Transmit data, CHB1, RS-422, output
36	-422TXDB1	-Transmit data, CHB1, RS-422, output
37	GND_6	Extra ground
38	2TXCA	Transmit clock, CHA2, RS-232, input
39	2RXCA	Receive clock, CHA2, RS-232, input
40	2RXCB	Receive clock, CHB2, RS-232, input

Apple Serial NB Card (Pins 41-62)

Pin	Signal Name	Signal Description
41	GND_5	Extra ground
42	2TXCB	Transmit clock, CHB2, RS-232, input
43	1DSRA	Data Set Ready, CHA1, RS-232, input
44	1DCDA/-IA1	Data Carrier Detect, RS-232/X.21 indication, -CHA1, input
45	1DTRA	Data Terminal Ready, CHA1, RS-232, output
46	1RIA	Ring Indicator, CHA1, RS-232, input
47	GND_4	CHB2 ground
48	1DSRB	Data Set Ready, CHB1, RS-232, input
49	1DCDB/-IB1	Data Carrier Detect, RS-232/X.21 indication, -CHB1, input
50	1DTRB	Data Terminal Ready, CHB1, RS-232, output
51	1RIB	Ring Indicator, CHB1, RS-232, input
52	GND_3	CHA2 ground
53	2DSRA	Data Set Ready, CHA2, RS-232, input
54	2DCDA	Data Carrier Detect, CHA2, RS-232, input
55	2DTRA	Data Terminal Ready, CHA2, RS-232, output
56	2RIA	Ring Indicator, CHA2, RS-232, input
57	GND_2	CHB1 ground
58	2DSRB	Data Set Ready, CHB2, RS-232, input
59	2DCDB	Data Carrier Detect, CHB2, RS-232, input
60	2DTRB	Data Terminal Ready, CHB2, RS-232, output
61	2RIB	Ring Indicator, CHB2, RS-232, input
62	GND_1	CHA1 ground

Connector type: DB-62 male

Macintosh Plus and Later Peripheral Cable Guide

	Service/Engineering Part Number	Model #	Cable Color
StyleWriter ImageWriter II and II/L ImageWriter LQ Apple Personal Modem Data Modem 2400 AppleFax Modem	590-0552	M0197	Smoke
	or		
	590-0340*	M0187	Beige
ImageWriter and IW 15-Inch AppleLine Cluster Controller	590-0169	M0150	Medium brown
	and		
	699-0430 590-0553	M0199	Smoke
	or		
	590-0341*	M0189	Beige
Modem 300 and 1200	590-0197	M0170	Medium brown
	and		
	699-0430 590-0553	M0199	Smoke
	or		
	590-0341*	M0189	Beige
SCSI Devices – System Cable	658-8031 590-0305	M0206	Smoke
	or		
	590-0345*		Beige
SCSI Devices – Peripheral Interface Cable (Male to Male)	658-8034 590-0306	M0207	Smoke
	or		
	590-0346*		Beige
SCSI Devices – Cable Extender (Male to Female)	658-8033 590-0307	M0208	Smoke
	or		
	590-0347*		Beige
SCSI Devices – Terminator	658-8032 590-0304	M0209	Smoke
	or		
	590-0344		Beige

* Indicates cable is obsolete

Macintosh 128K, 512K, and 512K enhanced Peripheral Cable Guide

	Service/Engineering Part Number	Model #	Cable Color
ImageWriter II and II/L ImageWriter LQ Apple Personal Modem Data Modem 2400	590-0551 or 590-0332*	M0196 M0185	Smoke Beige
ImageWriter and IW 15-Inch AppleLine Cluster Controller	590-0169	M0150	Medium brown
Modem 300 and 1200	590-0197	M0170	Medium brown

* Indicates cable is obsolete

Apple II Family Computers

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Introduction

This section contains the specifications for all the built-in interfaces and interface card connectors for the Apple II family of computers. Built-in interfaces are covered first, followed by interface cards. Illustrations at the beginning of the section show the locations of the built-in interface connectors.

Notes:

A slash (/) after the signal name indicates that the signal is valid when the signal is low.

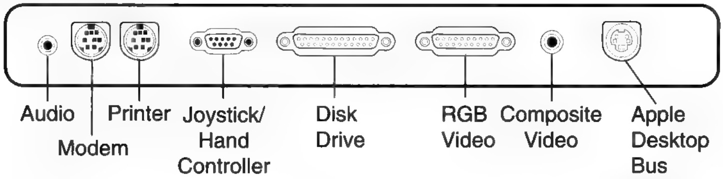
The connector specified is for the cable end, not the computer port.

The recommended interface card switch settings are in bold.

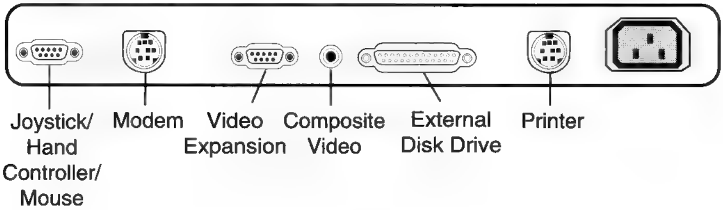
In the peripheral connections tables, accessory kit part numbers followed by an asterisk (*) include items in addition to the cable (software and/or manuals, for example).

Computer Port Locations

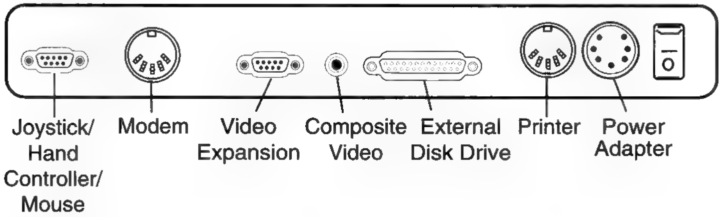
APPLE IIGS


Audio
Modem
Printer
Joystick/ Hand Controller
Disk Drive
RGB Video
Composite Video
Apple Desktop Bus

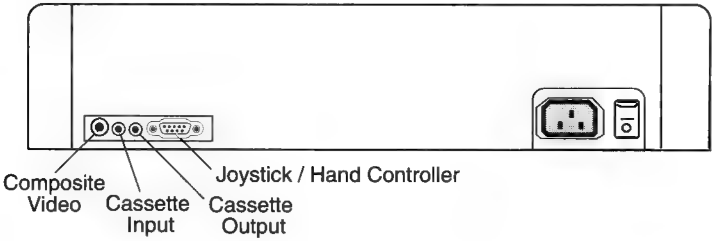
APPLE IIc Plus


Joystick/ Hand Controller/ Mouse
Modem
Video Expansion
Composite Video
External Disk Drive
Printer

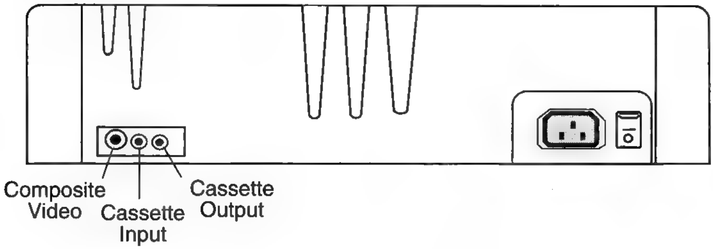
APPLE IIc


Joystick/ Hand Controller/ Mouse
Modem
Video Expansion
Composite Video
External Disk Drive
Printer
Power Adapter

APPLE IIe


Composite Video
Cassette Input
Cassette Output
Joystick / Hand Controller

APPLE II / II+


Composite Video
Cassette Input
Cassette Output

Apple IIGS Computer Ports

Sound Input/Output Connector

Pin	Signal Description	Pin	Signal Description
1	A/D converter input	5	Channel address 1
2	Analog ground	6	Channel strobe/
3	Analog output	7	Channel address 2
4	Channel address 0		

Connector type: 7-pin Molex

This connector (J25) is located on the logic board, near the right-front side of the computer just below the memory expansion connector. Connector J25 is not shown in the illustration. Pin 1 is at the front of the logic board.

Audio Connector

Pin	Signal Description
1	Signal ground
2	Earphone 1
3	Earphone 2

Connector type: Stereo miniature phone plug (3.66 mm)

Composite Video Connector

Pin	Signal Description	Pin	Signal Description
(Sleeve)	System common ground	(Tip)	NTSC composite video

Connector type: RCA phono plug

Apple IIGS Computer Ports

Modem and Printer Connectors

Pin	Signal Name	Signal Description
1	DTR	Data Terminal Ready
2	HSKi	Handshake in
3	TX Data -	Transmit Data -
4	GND	Signal ground
5	RX Data -	Receive Data -
6	TX Data +	Transmit Data +
7	GPI	General-Purpose Input
8	RX Data +	Receive Data +

Connector type: Mini DIN-8 male

All signals are RS-422.

Factory defaults:
PRINTER port (slot 1) defaults to 9600 baud, 8 data bits, no parity, 1 stop bit, unlimited line length, LF after CR, DCD and DSR/DTR handshake, no echoing, and no buffering.

MODEM port (slot 2) defaults to 1200 baud, 8 data bits, no parity, 1 stop bit, unlimited line length, no LF after CR, DCD and DSR/DTR handshake, no echoing, and no buffering.

Apple Desktop Bus Connector

Pin	Signal Name	Signal Description
1	Data	Bidirectional data bus
2	NC	Reserved
3	Power	+5 volts
4	Ground	Signal ground

Connector type: Mini DIN-4 male

Total length of cables should not exceed 16 feet (5 meters).

Floppy Drive Connector

Pin	Signal Name	Signal Description
1	GND	Signal ground
2	GND	Signal ground
3	GND	Signal ground
4	3.5DISK	3.5- or 5.25-inch drive select
5	-12V	-12 volts DC
6	+5V	+5 volts DC
7	+12V	+12 volts DC
8	+12V	+12 volts DC
9	DR2	Drive 2 select
10	WRPROTECT	Write-protect input
11	Phase 0	Motor phase 0 output
12	Phase 1	Motor phase 1 output
13	Phase 2	Motor phase 2 output
14	Phase 3	Motor phase 3 output
15	WREQ	Write request
16	HDSEL	Head select
17	DR1	Drive 1 select
18	RDDATA	Read data input
19	WDATA	Write data output

Connector type: DB-19 male

The Apple 5.25 Drive, UniDisk 5.25, Disk IIc, Apple 3.5 Drive, or UniDisk 3.5 may be connected to this connector.

Apple IIGS Computer Ports

RGB Video Connector

Pin	Signal Name	Signal Description
1	GND	Red signal ground
2	RED	Red analog video
3	COMP	Composite sync
4	NC	No connection
5	GREEN	Green analog video
6	GND	Green signal ground
7	-5V	-5 volts DC
8	+12V	+12 volts DC
9	BLUE	Blue analog video
10	NC	No connection
11	SOUND	Analog sound (1 volt peak-to-peak)
12	NTSC/PAL	Composite video
13	GND	Blue signal ground
14	NC	No connection
15	NC	No connection
(Shield)	GND	System ground

Connector type: DA-15 male

CAUTION: The signals on this connector are not the same as those on the DA-15 of the Apple IIc, III, III Plus; Macintosh II video cards; or the EtherTalk Interface Card. DO NOT connect an Apple IIc, III or III Plus; Macintosh II video card; or EtherTalk Interface Card device or cable to the Apple IIGS.

Apple IIGS Computer Ports

Joystick/Hand Controller Connector

Pin	Signal Name	Signal Description
1	SW1	Switch input 1/Option key
2	+5V	+5 volts
3	GND	Signal ground
4	PDL2	Analog input 2
5	PDL0	Analog input 0
6	SW2	Switch input 2
7	SW0	Switch 0/Open Apple key
8	PDL1	Analog input 1
9	PDL3	Analog input 3

Connector type: DE-9 male

These signals are also available on a 16-pin DIP socket labeled GAME I/O (J21) inside the case. This socket has the same pinouts as the Apple II/II Plus game controller connector.

Apple IIc/IIc Plus Computer Ports

Modem and Printer Connectors – DIN-5

Pin	Signal Name	Signal Description
1	DTR	Data Terminal Ready
2	TD	Transmit Data
3	GND	Signal ground
4	RD	Receive Data
5	DSR	Data Set Ready

Connector type: DIN-5 male

This connector is present on the Apple IIc.

Factory defaults:
PRINTER port (slot 1) defaults to 9600 baud, 8 bits, no parity, 2 stop bits, 80 characters per line, LF after CR, hardware handshake.

MODEM port (slot 2) defaults to 300 baud, 8 bits, no parity, 1 stop bit, 80 characters per line, no LF after CR. DTR is an output. DSR is an input.

Apple IIc/IIc Plus Computer Ports

Modem and Printer Connectors – Mini DIN-8

Pin	Signal Name	Signal Description
1	HSKo	Handshake out
2	HSKi	Handshake in
3	TXD-	Transmit Data -
4	GND	Signal ground
5	RXD-	Receive Data
6	TXD+	Transmit Data +
7	NC	No connection
8	RXD+	Receive Data +

Connector type: Mini DIN-8 male

This connector is present on the Apple IIc Plus.

All signals are RS-422.

Factory defaults:
PRINTER port (slot 1) defaults to 9600 baud, 8 bits, no parity, 2 stop bits, 80 characters per line, LF after CR, hardware handshake.

MODEM port (slot 2) defaults to 300 baud, 8 bits, no parity, 1 stop bit, 80 characters per line, no LF after CR. DTR is an output. DSR is an input.

To connect DE-9 cables (used with the Apple IIc) to the Mini DIN-8 port, use adapter cable 590-0553/699-0430 (smoke) or 590-0341 (beige).

Joystick/Hand Controller/Mouse Connector

Pin	Signal Name	Signal Description
1	MOUSEID/ GAMESW1	Mouse identifier; when active, disables hand controller timer Switch input 1
2	+5V	+5 volts, 100-mA maximum current drain
3	GND	System ground
4	XDIR NC	Mouse x-direction indicator No connection
5	XMOVE PDL0	Mouse x-movement interrupt Hand controller input; connected through a 150 K-ohm variable resistor to +5 volts
6	NC	No connection
7	MSW/ GAMESW0	Mouse button Switch input 0
8	YDIR PDL1	Mouse y-direction indicator See pin 5
9	YMOVE NC	Mouse y-movement interrupt No connection

Connector type: DE-9 male

The signal name and description listed first applies to a mouse. The other signal name and description applies to a hand controller or joystick.

Video Expansion Connector

Pin	Signal Name	Signal Description
1	VIDEO	Text signal from GLU
2	14M	14-MHz timing signal from the system oscillator
3	SYNC/	Display sync signal from IOU pin 39
4	SEGB	Display vertical counter bit from IOU pin 4
5	1VSOUND	One-volt sound signal from AUD pin 5
6	LDPS/	Video shift register load enable from TMG pin 12
7	WNDW/	Active area display blanking
8	+12V	+12 volts, 300-mA maximum
9	PRAS/	RAM row address strobe from TMG pin 19
10	GR	Graphics-mode enable from IOU pin 2
11	SEROUT/	Serialized character generator output from 74LS166 (UE6) pin 1
12	NTSC	NTSC composite video signal from VID
13	GND	Signal ground
14	VIDD7	Causes half-dot shift if high
15	CREF	3.58-MHz color reference from TMG pin 3

Connector type: DA-15 male

The video expansion connector is used for connecting the Apple Flat Panel Display or RF modulator.

CAUTION: The signals on this connector are not the same as on the DA-15 of the Apple IIGS, III, III Plus; Macintosh II video card; or EtherTalk Interface Card. DO NOT connect an Apple IIGS, III, III Plus; Macintosh II video card; or EtherTalk Interface Card device or cable to the Apple IIc.

Apple IIc/IIc Plus Computer Ports

External Floppy Drive Connector

Pin	Signal Name	Signal Description
1	GND	Ground reference
2	GND	Ground reference
3	GND	Ground reference
4	GND	Ground reference
5	-12V	-12 volts
6	+5V	+5 volts
7	+12V	+12 volts
8	+12V	+12 volts
9	EXTINT/	External interrupt
10	WRPROT	Write-protect input
11	PH0	Motor phase 0 output
12	PH1	See pin 11
13	PH2	See pin 11
14	PH3	See pin 11
15	WRREQ/	Write request
16	NC	No connection
17	DR1/	Drive 1 select
18	RDDATA	Read data input
19	WRDATA	Write data input

Connector type: DB-19 male

The Disk IIc, Apple 5.25 Drive, UniDisk 5.25, Apple 3.5 Drive, or UniDisk 3.5 may be connected to this port.

Apple IIc/IIc Plus Computer Ports

Composite Video Connector

Pin	Signal Name	Signal Description
(Tip)	VIDEO	NTSC composite video
(Sleeve)	GND	System common ground

Connector type: RCA phono plug

Audio Connector

Pin	Signal Name	Signal Description
(Tip)	AUDIO	Audio signal
(Sleeve)	GROUND	System electrical ground

Connector type: Monaural miniature phone plug (3.66 mm)

This connector (not shown in the illustration) is on the left side of the case near the keyboard. This connector is not present on the Apple IIc Plus. Connecting to the audio connector disables the internal speaker.

Power Adapter Connector

Pin	Signal Name	Signal Description
1	NC	No connection
2	GND	Signal ground
3	GND	Signal ground
4	SGND	Shield ground
5	+15V	+15 volts DC
6	+15V	+15 volts DC
7	NC	No connection

Connector type: DIN-7 male

The power adapter connector connects an external power supply to the Apple IIc. The Apple IIc Plus does not require an external power supply.

Apple II/II Plus/IIe Computer Ports

Cassette Input Connector

Pin	Signal Name	Signal Description
(Tip)	DATA IN	Audio in; one volt peak-to-peak; impedance of 12K ohms
(Sleeve)	GND	System electrical ground

Connector type: Monaural miniature phone plug

Cassette Output Connector

Pin	Signal Name	Signal Description
(Tip)	DATA OUT	Audio out; 25 mV into a 100-ohm load
(Sleeve)	GND	System electrical ground

Connector type: Monaural miniature phone plug

Apple II/II Plus/IIe Computer Ports

Composite Video Connector

Pin	Signal Name	Signal Description
(Sleeve)	GND	System common ground
(Tip)	VIDEO	NTSC composite video

Connector type: RCA phono plug

Apple II and II Plus video level is adjustable from 0 to 1 volt by a 200-ohm potentiometer (not shown in the illustration) located on the logic board near the right rear of the computer. Apple IIe video level is not adjustable.

Auxiliary Video Connector

Pin	Signal Name	Signal Description
1	GND	System common ground
2	VIDEO	NTSC positive composite video
3	+12V	+12 volts
4	+5V	+5 volts

Connector type: Molex KK100 series

This connector (not shown in the illustration) is located inside the computer on the logic board near the right rear of the computer.

Video level is not adjustable. On the Apple II/II Plus, pin 1 is at the edge of the logic board. On the Apple IIe, pin 1 is toward the front of the logic board.

Apple II/II Plus/IIe Computer Ports

Game Controller Connector

Pin	Signal Name	Signal Description
1	+5V	+5 volts, 100-mA maximum current drain
2	PB0	Push-button input; standard 74LS series signal levels
3	PB1	See pin 2
4	PB2	See pin 2
5	C040 STROBE/	General-purpose strobe output; goes low during phase zero of a read or write cycle to any address from $C040 to $C04F
6	GC0	Game controller input; connected through a 150K-ohm variable resistor to +5V
7	GC2	See pin 6
8	GND	System electrical ground
9	NC	No connection
10	GC1	See pin 6
11	GC3	See pin 6
12	AN3	Annunciator; standard 74LS-series signal levels; must be buffered if used to drive other than TTL inputs
13	AN2	See pin 12
14	AN1	See pin 12
15	AN0	See pin 12
16	NC	No connection

Connector type: 16-pin DIP header

This connector (not shown in the computer port location illustration) is on the logic board near the right side of the computer.

Joystick/Hand Controller Connector

Pin	Signal Name	Signal Description
1	PB1	Push-button input; standard 74LS series signal levels
2	+5V	+5 volts, 100-mA maximum current drain
3	GND	System electrical ground
4	PDL2	Hand control input; connected through a 150 K-ohm variable resistor to +5 V
5	PDL0	See pin 4
6	PB2	See pin 1
7	PB0	See pin 1
8	PDL1	See pin 4
9	PDL3	See pin 4

Connector type: DE-9 Male

This connector is present only on the Apple IIe.

Communications Card Pin-outs

Pin	Signal Name	Signal Description
2	TXD	Transmit Data
3	RXD	Receive Data
4	RTS	Request To Send (jumpered to pin 8)
6	DSR	Data Set Ready (jumpered to pin 20)
7	GND	Signal ground
8	DCD	Data Carrier Detect (jumpered to pin 4)
20	DTR	Data Terminal Ready (jumpered to pin 6)

Connector type: DB-25 male

The Communications Card should be used only with low-speed devices (300 baud or below). No handshaking is available.

Apple II Interface Cards

Super Serial Card Pin-outs

Pin	Signal Name	Signal Description
1	FG	Frame Ground
2	TXD	Transmit Data
3	RXD	Receive Data
4	RTS	Request To Send
5	CTS	Clear To Send
6	DSR	Data Set Ready
7	SG	Signal Ground
8	DCD	Data Carrier Detect
9-18	NC	No connection
19	SCTS	Secondary Clear To Send
20	DTR	Data Terminal Ready
21-25	NC	No connection

Connector type: DB-25 male

This card is compatible with RS-232 serial devices.

When the jumper block is installed with the arrow pointing toward MODEM, the signals are as listed above. When the jumper block is pointing toward TERMINAL, the signals are the same as the signals produced when using a modem eliminator.

Apple II Interface Cards

Super Serial Card Switch Settings – Switch SW1 Printer Mode

	1	2	3	4	5	6	7
Baud rate							
50	ON	ON	ON	OFF			
75	ON	ON	OFF	ON			
110	ON	ON	OFF	OFF			
135	ON	OFF	ON	ON			
150	ON	OFF	ON	OFF			
300	ON	OFF	OFF	ON			
600	ON	OFF	OFF	OFF			
1200	OFF	ON	ON	ON			
1800	OFF	ON	ON	OFF			
2400	OFF	ON	OFF	ON			
3600	OFF	ON	OFF	OFF			
4800	OFF	OFF	ON	ON			
7200	OFF	OFF	ON	OFF			
9600	**OFF**	**OFF**	**OFF**	**ON**			
19200	OFF	OFF	OFF	OFF			
Mode select							
Printer					**OFF**	**ON**	
SIC P8 emulation					ON	OFF	
SIC P8A emulation					OFF	OFF	
Handshaking†							
Clear To Send (Pin 5)							**ON**
Secondary Clear To Send (Pin 19)							OFF

† Used in conjunction with Switch SW2, position 7. Switch SW2, position 7 must be set to the opposite on/off setting of switch SW1, position 7.

Super Serial Card Switch Settings – Switch SW2
Printer Mode

	1	2	3	4	5	6	7
Stop bits							
1	**ON**						
2	OFF						
Delay after CR							
32 ms.		ON					
Disabled		**OFF**					
Line width/video							
40 columns/video on			ON	ON			
72 columns/video off			ON	OFF			
80 columns/video off			OFF	ON			
132 columns/video off			**OFF**	**OFF**			
Auto LF on CR							
Enabled					ON		
Disabled					**OFF**		
Interrupts							
Enabled						ON	
Disabled						**OFF**	
Handshaking†							
Clear To Send (Pin 5)							**OFF**
Secondary Clear To Send (Pin 19)							ON

† Used in conjunction with Switch SW1, position 7. Switch SW1, position 7 must be set to the opposite on/off setting of switch SW2, position 7.

Super Serial Card Switch Settings – Switch SW1
Communication Mode

	1	2	3	4	5	6	7
Baud rate							
50	ON	ON	ON	OFF			
75	ON	ON	OFF	ON			
110	ON	ON	OFF	OFF			
135	ON	OFF	ON	ON			
150	ON	OFF	ON	OFF			
300	ON	OFF	OFF	ON			
600	ON	OFF	OFF	OFF			
1200	**OFF**	**ON**	**ON**	**ON**			
1800	OFF	ON	ON	OFF			
2400	OFF	ON	OFF	ON			
3600	OFF	ON	OFF	OFF			
4800	OFF	OFF	ON	ON			
7200	OFF	OFF	ON	OFF			
9600	OFF	OFF	OFF	ON			
19200	OFF	OFF	OFF	OFF			
Mode select							
Communication					**ON**	**ON**	
Handshaking †							
Clear To Send							**ON**

† Used in conjunction with Switch SW2, position 7. Switch SW2, position 7 must be set to the opposite on/off setting of switch SW1, position 7.

Super Serial Card Switch Settings – Switch SW2 Communication Mode

	1	2	3	4	5	6	7
Stop bits							
1	**ON**						
2	OFF						
Data bits							
8		**ON**					
7		OFF					
Parity							
None			**ON**	**ON**			
Odd			ON	OFF			
Even			OFF	OFF			
Auto LF on CR							
Enabled					ON		
Disabled					**OFF**		
Interrupts							
Enabled						ON	
Disabled						**OFF**	
Handshaking[†]							
Clear To Send							**OFF**

[†] Used in conjunction with Switch SW1, position 7. Switch SW1, position 7 must be set to the opposite on/off setting of switch SW2, position 7.

Apple II Interface Cards

Serial Interface Card Pin-outs

Pin	Signal Name	Signal Description
2	RXD	Receive Data
3	TXD	Transmit Data
4	RTS	Request To Send (jumpered to pin 5)
5	CTS	Clear To Send (jumpered to pin 4)
6	DSR	Data Set Ready (jumpered to pins 8 & 20)
7	GND	Signal ground
8	DCD	Data Carrier Detect (jumpered to pins 6 & 20)
20	DTR	Data Terminal Ready (jumpered to pins 6 & 8)

Connector type: DB-25 male

This card is compatible with RS-232 serial devices.

Apple II Interface Cards

Serial Interface Card Switch Settings

	1	2	3	4	5	6	7
Baud rate							
110	ON	ON	ON				
134.5	OFF	ON	ON				
300	ON	OFF	ON				
1200	**OFF**	**OFF**	**ON**				
2400	ON	ON	OFF				
4800	OFF	ON	OFF				
9600	ON	OFF	OFF				
19200	OFF	OFF	OFF				
Carriage return delay							
Disabled				**ON**			
1/4 second delay				OFF			
Line width/video							
40 columns/video on					ON	ON	
72 columns/video off					OFF	ON	
80 columns/video off					ON	OFF	
132 columns/video off					**OFF**	**OFF**	
Auto LF on CR							
Disabled							**ON**
Enabled							OFF

This card should be used only with low-speed devices (300 baud or below).

PROM P8A should be used with Qume-compatible printers. When using this PROM, the function of Switch 4 is different and the switch must be OFF.

Parallel Printer & Centronics Printer Interface Card Pin-outs

Pin	Signal Name	Signal Description
1	GND	System electrical ground
2	ACK	Acknowledge input
3	NC	No connection
4	F	Not used
5	NC	No connection
6	NC	No connection
7	NC	No connection
8	STROBE	Strobe output
9	NC	No connection
10	DP0	Data bit 0
11	DP1	Data bit 1
12	DP2	Data bit 2
13	DP3	Data bit 3
14	DP4	Data bit 4
15	DP5	Data bit 5
16	DP6	Data bit 6
17	DP7	Data bit 7
18	NC	No connection
19	NC	No connection
20	GND	System electrical ground

Connector type: Unterminated 20-pin flat cable

Parallel interface has the P1 (341-0005) PROM that provides a linefeed after carriage return. The jumper block is not wired.

Centronics interface has the P9 (341-0019) PROM that does not provide a linefeed after carriage return. The jumper block is prewired for negative strobe and positive acknowledge.

IEEE-488 Interface Pin-outs

Pin	Signal Name	Signal Description
1	DIO1	Data input/output, bit 1
2	DIO2	Data input/output, bit 2
3	DIO3	Data input/output, bit 3
4	DIO4	Data input/output, bit 4
5	EOI	End Or Identify
6	DAV	Data Valid
7	NRFD	Not Ready For Data
8	NDAC	Not Data Accepted
9	IFC	Interface Clear
10	SRQ	Service Request
11	ATN	Attention
12	SHIELD	Earth ground
13	DIO5	Data input/output, bit 5
14	DIO6	Data input/output, bit 6
15	DIO7	Data input/output, bit 7
16	DIO8	Data input/output, bit 8
17	REN	Remote Enable
18	GND	Logic ground
19	GND	Logic ground
20	GND	Logic ground
21	GND	Logic ground
22	GND	Logic ground
23	GND	Logic ground
24	GND	Logic ground

Connector type: 24-pin Centronics-type male

Parallel Interface Card Pin-outs

Pin	Signal Name	Signal Description
1	DI0	Data in, bit 0
2	GND	Signal ground
3	DI2	Data in, bit 2
4	GND	Signal ground
5	DO0	Data out, bit 0
6	DO1	Data out, bit 1
7	NC	No connection - blocked
8	DO2	Data out, bit 2
9	NC	No connection
10	NC	No connection
11	DO5	Data out, bit 5
12	DO6	Data out, bit 6
13	DO7	Data out, bit 7
14	DI4	Data in, bit 4
15	STROBE	Strobe output
16	ACK	Acknowledge input
17	DI1	Data in, bit 1
18	DI7	Data in, bit 7
19	DI5	Data in, bit 5
20	GND	Signal ground
21	DI6	Data in, bit 6
22	DO3	Data out, bit 3
23	DO4	Data out, bit 4
24	GND	Signal ground
25	DI3	Data in, bit 3

Connector type: DB-25 male

Parallel Interface Card Switch Settings

	1	2	3	4	5	6	7
Strobe length							
1 microsecond	OFF	OFF	OFF				
3 microseconds	**ON**	**OFF**	**OFF**				
5 microseconds	OFF	ON	OFF				
7 microseconds	ON	ON	OFF				
9 microseconds	OFF	OFF	ON				
11 microseconds	ON	OFF	ON				
13 microseconds	OFF	ON	ON				
15 microseconds	ON	ON	ON				
Strobe polarity							
Positive				**OFF**			
Negative				ON			
Acknowledge polarity							
Positive					**OFF**		
Negative					ON		
Firmware select							
Parallel Printer (No LF)						**OFF**	
Centronics						ON	
Interrupts							
Disabled							**OFF**
Enabled							ON

Apple II Video Overlay Card Pin-outs

Pin	Signal Description
1	Signal Ground
2	Blue Video
3	Red Video
4	No connection
5	CSYNC
6	No connection
7	No connection
8	Composite Video
9	Green Video
10	Signal Ground
11	Signal Ground
12	No connection
13	-5 volts
14	No connection
15	+12 volts

Connector type: DA-15 male

Apple II Interface Cards

Apple II SCSI and High-Speed SCSI Card Pin-outs

Pin	Signal Name	Signal Description
1	REQ/	Request
2	MSG/	Message
3	I/O/	Input/Output
4	RST/	Reset
5	ACK/	Acknowledge
6	BSY/	Busy
7	GND	Signal ground
8	DB0/	Data Bit 0
9	GND	Signal ground
10	DB3/	Data Bit 3
11	DB5/	Data Bit 5
12	DB6/	Data Bit 6
13	DB7/	Data Bit 7
14	GND	Signal ground
15	C/D/	Control/Data
16	GND	Signal ground
17	ATN/	Attention
18	GND	Signal ground
19	SEL/	Select
20	DBP/	Data Parity
21	DB1/	Data Bit 1
22	DB2/	Data Bit 2
23	DB4/	Data Bit 4
24	GND	Signal ground
25	NC	No connection

Connector type: DB-25 male

Not compatible with the Apple II or Apple II Plus.

CAUTION: This interface uses the same type of connector as a standard RS-232 serial interface, but it is electrically very different. DO NOT connect any RS-232 device or cable to this connector. Doing so can damage both the device and the computer.

Graphics Tablet Interface Pin-outs – Pen Connector

Pin	Signal Name	Signal Description
1	NC	No connection
2	GND	System electrical ground
3	PEN	Pen coil
4	PEN	Pen coil

Connector type: DE-9 male

Graphics Tablet Interface Pin-outs – Tablet Connector

Pin	Signal Name	Signal Description
1	YDRIVE	Y-axis input
2	XDRIVE	X-axis input
3	NC	No connection
4	RESET	Reset signal
5	GND	System electrical ground
6	-12V	-12 volts DC

Connector type: DE-9 male

Apple II, II Plus, and IIe Peripheral Cable Guide

	Service/Engineering Part Number	Model #	Cable Color
ImageWriter II and II/L ImageWriter LQ† Apple Personal Modem Data Modem 2400	590-0555 or 590-0331	A2C0312 or A2C0311	Smoke Beige
ImageWriter and IW 15-Inch Scribe Daisy Wheel Printer Color Plotter AppleLine Cluster Controller	590-0037	A2C0352* A2C0355* A2C0351* A2C0302* NA NA	Light gray
Modem 300 and 1200	590-0121	A2C0354*	Beige
Dot Matrix Printer with Parallel Interface Card	590-0042	NA	Varies
Dot Matrix Printer with Centronics Printer Card§	590-0036	NA	Varies

† The ImageWriter LQ should be set for 9600 baud when used with an Apple II, II Plus, or IIe. Set DIP switch 2, positions 1 and 2, to ON.

§ Set Dot Matrix Printer switch 1 position 8 to ON to provide a line feed on receipt of a carriage return.

Peripheral Cable Guides

Apple IIc Peripheral Cable Guide

	Service/Engineering Part Number	Model #	Cable Color
ImageWriter II and II/L ImageWriter LQ[†] Apple Personal Modem[§] Data Modem 2400[&]	590-0554 or 590-0333	A2C4313 or A2C4312	Smoke Beige
ImageWriter and IW 15-Inch Scribe Daisy Wheel Printer AppleLine Color Plotter[‡]	590-0191	A2C4515* A2C4520* NA A2C4510*	Beige
Modem 300 and 1200[*]	590-0192	A2C4505*	Beige

[†] The ImageWriter LQ must be set for 9600 baud when used with an Apple IIc. Set DIP switch 2, positions 1 and 2, to ON.

[§] Change the baud rate of the modem port on the computer to 1200 baud.

[&] Change the baud rate of the modem port on the computer to 2400 baud.

[‡] Change the baud rate of the printer port on the computer to 1200 baud.

[*] If a modem 1200 is being used, change the baud rate of the modem port of the computer to 1200 baud.

Apple IIGS and IIc Plus Peripheral Cable Guide

	Service/Engineering Part Number	Model #	Cable Color
ImageWriter II and II/L ImageWriter LQ[†] Apple Personal Modem Data Modem 2400[§]	590-0552 or 590-0340	M0197 M0187	Smoke Beige
ImageWriter and IW 15-Inch Scribe Daisy Wheel Printer Color Plotter[&] Cluster Controller	590-0037 and 590-0550	A2C0352* A2C0355* A2C0351* A2C0302* NA	Light gray Smoke
Modem 300 and 1200[‡]	590-0550 and 590-0121	A9M0333 A2C0354*	Smoke Beige
Dot Matrix Printer with Parallel Interface Card (Apple IIgs only)	590-0042	NA	Varies
Dot Matrix Printer with Centronics Printer Card (Apple IIgs only)[*]	590-0036	NA	Varies

[†] The ImageWriter LQ must be set for 9600 baud when used with an Apple IIGS or IIc Plus. Set DIP switch 2, positions 1 and 2, to ON.

[§] Change the baud rate of the modem port on the computer to 2400 baud.

[&] Set the baud rate of the Color Plotter and printer port on the computer to 1200 baud.

[‡] If a Modem 300 is being used, change the baud rate of the modem port of the computer to 300 baud.

[*] Set Dot Matrix Printer switch 1 position 8 to ON to provide a line feed on receipt of a carriage return.

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Apple III & Lisa/MAC XL Computers

Apple III & Lisa/Mac XL Computers

Introduction

This section contains the specifications for all the built-in interfaces and interface card connectors for the Apple III/III Plus and Lisa/Macintosh XL families of computers. Built-in interfaces and interface cards for the Apple III/III Plus are covered first, followed by the Lisa/Macintosh XL. Illustrations at the beginning of the section show the locations of the built-in interface connectors.

Notes:
A slash (/) after the signal name indicates that the signal is valid when the signal is low.

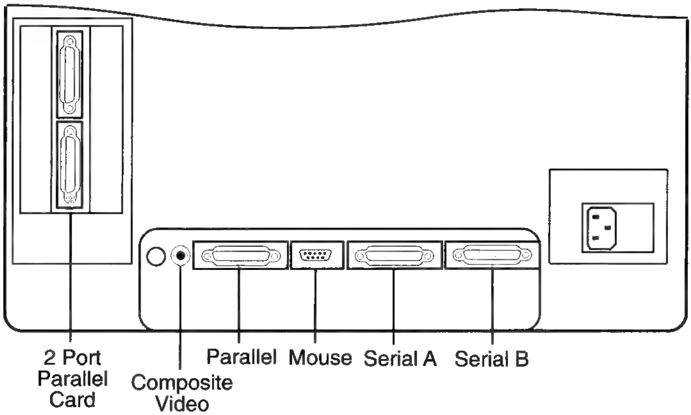
The connector specified is for the cable end, not the computer port.

In the peripheral connections tables, accessory kit part numbers followed by an asterisk (*) include items in addition to the cable (software and/or manuals, for example).

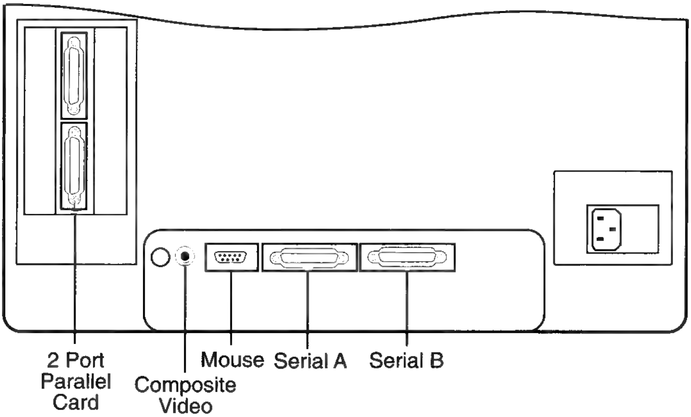
Accessory kit part numbers followed by a dagger (†) include a modem eliminator cable (590-0166).

Computer Port Locations

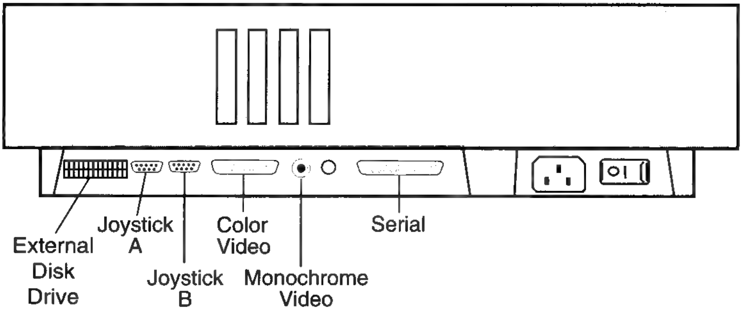
LISA 2 AND LISA 2/5


2 Port
Parallel
Card
Composite
Video
Parallel
Mouse
Serial A
Serial B

LISA 2/10 AND MACINTOSH XL


2 Port
Parallel
Card
Composite
Video
Mouse
Serial A
Serial B

APPLE III and III Plus


External
Disk
Drive
Joystick
A
Joystick
B
Color
Video
Monochrome
Video
Serial

Apple III/III Plus Computer Ports

Audio Connector

Pin	Signal Name	Signal Description
(Tip)	AUDIO	.5-volt peak-to-peak audio signal
(Sleeve)	GND	Signal ground

Connector type: Miniature phone plug

The internal speaker is disabled when this connector is in use.

Monochrome Video Connector

Pin	Signal Name	Signal Description
(Tip)	BWVID	Monochrome video signal
(Sleeve)	GND	Signal ground

Connector type: RCA phono plug

Serial Connector

Pin	Signal Name	Signal Description
1	SGND	Shield ground
2	TXD	Transmit Data
3	RCD	Receive Data
4	RTS	Request To Send
5	CTS	Clear To Send
6	DSR	Data Set Ready
7	GND	Signal ground
8	DCD	Data Carrier Detect
9-19	NC	No connection
20	DTR	Data Terminal Ready
21-25	NC	No connection

Connector type: DB-25 male

This interface is compatible with RS-232 serial devices.

Apple III/III Plus Computer Ports

External Floppy Drive Connector

Pin	Signal Name	Signal Description
1	SGND	Shield ground
2	DPH0	Motor phase 0
3	GND	Signal ground
4	DPH1	Motor phase 1
5	GND	Signal ground
6	DPH2	Motor phase 2
7	GND	Signal ground
8	DPH3	Motor phase 3
9	-12F	-12 volts
10	WRREQ	Write request
11	+5F	+5 volts
12	+5F	+5 volts
13	+12F	+12 volts
14	ENBL1E/	Drive select 1
15	+12F	+12 volts
16	RDDATA	Read data
17	+12F	+12 volts
18	WRDATA	Write data
19	+12F	+12 volts
20	WRPROT	Write protect
21	ENBL3E/	Drive select 3
22	ENBL2E/	Drive select 2
23	AII/	Apple II emulation mode active
24	SIDE2/1	Side select
25	NC	No connection
26	EXT/	External drive

Connector type: 26-pin 2-row x 13-pin female IDC

This connector is present on the Apple III only.

Color Video Connector

Pin	Signal Name	Signal Description
1	SG	Shield ground
2	XRGB4	TTL output with instantaneous color information; linear-weighted sum of these four signals will form a true 16-color RGB video signal
3	SYNCH	Composite sync signal (negative-going)
4	PDI	Not used
5	XRGB1	See pin 2
6	GND	Power and signal ground
7	-5V	-5 volts, 200-mA maximum current drain
8	+12V	+12 volts, 500-mA maximum current drain
9	XRGB2	See pin 2
10	XRGB8	See pin 2
11	BWVID	Black-and-white composite video; NTSC-compatible signal with negative-going sync; 1 volt peak-to-peak into a 75-ohm load
12	NTSC	Color composite video; NTSC-compatible signal with negative-going sync; 1 volt peak-to-peak into a 75-ohm load
13	GND	Power and signal ground
14	-12V	-12 volts, 200-mA maximum current drain
15	+5V	+5 volts, 1 amp maximum current drain

Connector type: DA-15 male

This port supports the connection of any NTSC-compatible color or monochrome monitor. Additional circuitry is required to support an RGB monitor. Current ratings are with no peripheral cards installed.

CAUTION: The signals on this connector are not the same as on the DA-15 of the Apple IIc, IIGS, Macintosh II video cards, or EtherTalk Interface Card. DO NOT connect an Apple IIc, IIGS, Macintosh II video cards, or EtherTalk Interface Card device or cable to the Apple III or III Plus.

Apple III/III Plus Computer Ports

Joystick A Connector

Pin	Signal Name	Signal Description
1	GND	Shield ground
2	+5V	+5 volts
3	GND	Power and signal ground
4	JS1-X	Horizontal analog input, read by PDL(2); in Emulation mode, equivalent to Apple II Paddle 0 (GC0) input, read by PDL(0)
5	JS1-B	Joystick switch input, read by button (2); in Emulation mode, equivalent to Apple II Paddle 0 button (PB1) input, read by PEEK(-16287)
6	+12V	+12 volts
7	GND	Power and signal ground
8	JS1-Y	Vertical analog input, read by PDL(3); in Emulation mode, equivalent to Apple II Paddle 2 (GC2) input, read by PDL(2)
9	JS1-SW	Joystick switch input, read by button (3); in Emulation mode, equivalent to Apple II Paddle 2 button (PB3) input, read by PEEK(-16285)

Connector type: DE-9 male

This port also supports the connection of a Silentype III printer.

Circuitry is provided for two analog devices (potentiometers) and two digital devices (switches). The analog inputs accept input voltage in the range of 0 to 2.2 volts and can sink 3 mA. The digital inputs are TTL.

Joystick B Connector

Pin	Signal Name	Signal Description
1	GND	Shield ground
2	+5V	+5 volts
3	GND	Power and signal ground
4	JS0-X	Horizontal analog input, read by PDL(0); in Emulation mode, equivalent to Apple II Paddle 1 (GC1) input, read by PDL(1)
5	JS0-B	Joystick switch input, read by Button (0); in Emulation mode, equivalent to Apple II Paddle 1 button (PB2) input, read by PEEK(-16286)
6	+12V	+12 volts
7	GND	Power and signal ground
8	JS0-Y	Vertical analog input, read by PDL(1); in Emulation mode, equivalent to Apple II Paddle 3 (GC3) input, read by PDL(3)
9	JS0-SW	Joystick switch input, read by Button (1); not used in Emulation mode

Connector type: DE-9 male

Circuitry is provided for two analog devices (potentiometers) and two digital devices (switches). The analog inputs accept input voltage in the range of 0 to 2.2 volts and can sink 3 mA. The digital inputs are TTL.

Apple III/III Plus Interface Cards

Universal Parallel Interface Card Pin-outs (Pins 1-20)

Pin	Signal Name	Signal Description
1	DO0	Port B, Data Output, bit 0
2	DO1	Port B, Data Output, bit 1
3	DO2	Port B, Data Output, bit 2
4	DO3	Port B, Data Output, bit 3
5	DO4	Port B, Data Output, bit 4
6	DO5	Port B, Data Output, bit 5
7	DO6	Port B, Data Output, bit 6
8	DO7	Port B, Data Output, bit 7
9	NC	No connection
10	NC	No connection
11	GND	Signal ground
12	ACK	Acknowledge input
13	DI0	Port B, Data Input, bit 0
14	DI1	Port B, Data Input, bit 1
15	DI2	Port B, Data Input, bit 2
16	DI3	Port B, Data Input, bit 3
17	DI4	Port B, Data Input, bit 4
18	STROBE	Strobe output
19	DI5	Port B, Data Input, bit 5
20	DO0	Port A, Data Output, bit 0

Universal Parallel Interface Card Pin-outs (Pins 21-40)

Pin	Signal Name	Signal Description
21	DO1	Port A, Data Output, bit 1
22	DO2	Port A, Data Output, bit 2
23	DO3	Port A, Data Output, bit 3
24	DO4	Port A, Data Output, bit 4
25	DO5	Port A, Data Output, bit 5
26	DO6	Port A, Data Output, bit 6
27	DO7	Port A, Data Output, bit 7
28	DI6	Port B, Data Input, bit 6
29	DI7	Port B, Data Input, bit 7
30	GND	Signal ground
31	NC	No connection
32	NC	No connection
33	DRO	Data Ready Output
34	GND	Signal ground
35	GND	Signal ground
36	GND	Signal ground
37	GND	Signal ground
38	ACK	Acknowledge
39	GND	Signal ground
40	GND	Signal ground

Connector type: 40-pin 2-row x 20-pin female IDC

Pins 11-30 are used to support a parallel printer.

Serial Card III Pin-outs

Pin	Signal Name	Signal Description
1	SGND	Shield ground
2	TXD	Transmit Data
3	RXD	Receive Data
4	RTS	Request To Send
5	CTS	Clear To Send
6	DSR	Data Set Ready
7	GND	Signal ground
8	DCD	Data Carrier Detect
9-19	NC	No connection
20	DTR	Data Terminal Ready
21-25	NC	No connection

Connector type: DB-25 male

This interface is compatible with RS-232 serial devices.

The signals are as listed above when the modem eliminator button is pushed IN. When the modem eliminator button is OUT, the Serial Card III signals are the same as the signals produced by a modem eliminator cable.

Lisa/Macintosh XL Computer Ports

Mouse Connector

Pin	Signal Name	Signal Description
1	Switch 1	Mouse switch
2	+5V	+5 volts DC
3	GND	System electrical ground
4	Left	Mouse movement - left
5	Right	Mouse movement - right
6	Switch 2	Connected to CHK on parallel port
7	Button	Not used
8	Down	Mouse movement - down
9	Up	Mouse movement - up

Connector type: DE-9 male

Composite Video Connector

Pin	Signal Name	Signal Description
(Tip)	VIDEO	Composite video output
(Sleeve)	GND	System electrical ground

Connector type: RCA phono plug

Lisa/Macintosh XL Computer Ports

Serial A Connector

Pin	Signal Name	Signal Description
1	FG	Frame Ground
2	TXD	Transmit Data
3	RXD	Receive Data
4	RTS	Request To Send
5	CTS	Clear To Send
6	DSR	Data Set Ready
7	GND	Signal Ground
8	DCD	Data Carrier Detect
15	TXC	Transmit clock input
17	RXC	Receive clock input
20	DTR	Data Terminal Ready
24	TEXT	Transmit clock output

Connector type: DB-25 male

This interface is compatible with RS-232 serial devices.

Lisa/Macintosh XL Computer Ports

Serial B Connector

Pin	Signal Name	Signal Description
1	GND FG	Frame Ground Frame Ground
2	TXD- TXD	Transmit Data - Transmit Data
3	RXD- RXD	Receive Data - Receive Data
4	NC RTS	No connection Request To Send
5	NC	No connection
6	HSK/DSR DSR	Handshake/Data Set Ready Data Set Ready
7	GND	Signal ground
19	RXD+ RD	Receive Data + AppleTalk Receive Data
20	TXD+/DTR DTR	Transmit Data + Data Terminal Ready

Connector type: DB-25 male

The upper set of signal names and descriptions listed applies to RS-422. The lower set applies to RS-232.

Lisa/Macintosh XL Computer Ports

Parallel Connector

Pin	Signal Name	Signal Description
1	GND	System electrical ground
2	GND	System electrical ground
3	DRW/	Data direction
4	GND	System electrical ground
5	DD0	Data bit 0 (bidirectional)
6	DD1	Data bit 1 (bidirectional)
7	N/C	No connection - blocked
8	DD2	Data bit 2 (bidirectional)
9	GND	System electrical ground
10	GND	System electrical ground
11	DD5	Data bit 5 (bidirectional)
12	DD6	Data bit 6 (bidirectional)
13	DD7	Data bit 7 (bidirectional)
14	GND	System electrical ground
15	PSTRB/	Strobe (output)
16	BSY	Busy (input)
17	CMD/	Command
18	PARITY/	Parity (bidirectional)
19	OCD	Device on-line status
20	GND	System electrical ground
21	CRES/	Reset (output)
22	DD3	Data bit 3 (bidirectional)
23	DD4	Data bit 4 (bidirectional)
24	GND	System electrical ground
25	CHK	Interrupt (input)

Connector type: DB-25 male

This interface is found only on the Lisa 2.0/2.5.

Two-Port Parallel Card Pin-outs

Pin	Signal Name	Signal Description
1	GND	System electrical ground
2	GND	System electrical ground
3	DRW/	Data direction
4	GND	System electrical ground
5	DD0	Data bit 0 (bidirectional)
6	DD1	Data bit 1 (bidirectional)
7	NC	No connection - blocked
8	DD2	Data bit 2 (bidirectional)
9	GND	System electrical ground
10	GND	System electrical ground
11	DD5	Data bit 5 (bidirectional)
12	DD6	Data bit 6 (bidirectional)
13	DD7	Data bit 7 (bidirectional)
14	GND	System electrical ground
15	PSTRB/	Strobe (output)
16	BSY	Busy (input)
17	CMD/	Command
18	PARITY/	Parity (bidirectional)
19	OCD	Device on-line status
20	GND	System electrical ground
21	CRES/	Reset (output)
22	DD3	Data bit 3 (bidirectional)
23	DD4	Data bit 4 (bidirectional)
24	GND	System electrical ground
25	CHK	Interrupt (input)

Connector type: DB-25 male

Apple III and III Plus Peripheral Cable Guide

	Service/Engineering Part Number	Model #	Cable Color
ImageWriter II and II/L ImageWriter LQ[†] Apple Personal Modem Data Modem 2400	590-0331 or 590-0555	A2C0311 or A2C0312	Beige Smoke
ImageWriter and IW 15-Inch Scribe Daisy Wheel Printer AppleLine Color Plotter[§]	590-0037 and 590-0166	A3C0352*+ NA A3C0351*+ A2C0302*+ A3C0302*+	Light gray Gray
Cluster Controller	590-0037	NA	Light gray
Modem 300 and 1200	590-0121	A3C0354*	Beige
Dot Matrix Printer with Universal Parallel Interface Card[&]	590-0036	NA	Varies

[†] The ImageWriter LQ must be set for 9600 baud when used with an Apple III/III Plus. Set DIP switch 2, positions 1 and 2, to ON.

[§] The Color Plotter must be set for seven data bits and odd parity for use with an Apple III/III Plus. Set switch 1 to ON and switch 2 to OFF.

[&] Set the auto line feed switch on the UPIC to AUTO.

Lisa and Macintosh XL Peripheral Cable Guide

	Service/Engineering Part Number	Model #	Cable Color
ImageWriter II and II/L ImageWriter LQ† Apple Personal Modem Data Modem 2400	590-0331 or 590-0555	A2C0311 or A2C0312	Beige Smoke
ImageWriter and IW 15-Inch Scribe Daisy Wheel Printer AppleLine	590-0037 and 590-0166	A6C0352*+ A6C0355*+ A6C0351*+ NA	Light gray Gray
Cluster Controller	590-0037	NA	Light gray
Modem 300 and 1200	590-0121	A6C0354*	Beige
Dot Matrix Printer	590-0042	NA	Varies

Serial port A is the preferred port for connecting all serial devices, except AppleLine. AppleLine should be connected to serial port B.

† The ImageWriter LQ must be set for 9600 baud when used with a Lisa/Macintosh XL. Set DIP switch 2, positions 1 and 2, to ON.

Peripherals

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Introduction

This section contains interface specifications for Apple peripheral devices. The factory switch settings of each device are shown in bold type.

Notes:
This section refers to switches as either "ON" (closed) or "OFF" (open).

Switches marked "XX" are unused and can be set either ON or OFF.

A slash (/) after the signal name indicates that the signal is valid when the signal is low.

The connector specified is for the cable end, not the computer port.

Laser Printers

LaserWriter II NT, II NTX, IIf, and IIg Pin-outs – RS-422

Pin	Signal Name	Signal Description
1	HSKo	Handshake out
2	HSKi	Handshake in
3	TxD-	Transmit Data -
4	SG	Signal Ground
5	RxD-	Receive Data -
6	TxD+	Transmit Data +
7	GPi	General-Purpose input
8	RxD+	Receive Data +

Connector type: Mini DIN-8 male

LaserWriter II NT, II NTX, IIf, and IIg Pin-outs – RS-232

Pin	Signal Name	Signal Description
1	SGND	Signal ground
2	TxD	Transmitted Data
3	RxD	Received Data
4	RTS	Request To Send
5	CTS	Clear To Send
6	DSR	Data Set Ready
7	SG	Signal Ground
8	DCD	Data Carrier Detect
20	DTR	Data Terminal Ready
22	RI	Ring Indicator

Connector type: DB-25 male

LaserWriter II NTX, II SC, IIf, and IIg
Pin-outs – SCSI Port

Pin	Signal Name	Signal Description
1-12	GND	Signal ground
13	NC	No connection
14-25	GND	Signal ground
26	DB0/	Data Bit 0
27	DB1/	Data Bit 1
28	DB2/	Data Bit 2
29	DB3/	Data Bit 3
30	DB4/	Data Bit 4
31	DB5/	Data Bit 5
32	DB6/	Data Bit 6
33	DB7/	Data Bit 7
34	DBP/	Data Parity
35-37	GND	Signal ground
38	+5V	+5 volts
39	GND	Signal ground
40	GND	Signal ground
41	ATN/	Attention
42	GND	Signal ground
43	BSY/	Busy
44	ACK/	Acknowledge
45	RST/	Reset
46	MSG/	Message
47	SEL/	Select
48	C/D/	Control/Data
49	REQ/	Request
50	I/O/	Input/Output

Connector type: BR-50 male

LaserWriter IIg Pin-outs – Ethernet

Pin	Signal Name	Signal Description
1	FN Pwr	+12 volts @ 175 mA or +5 volts @ 420 mA
2	DI-A	Data In circuit A
3	DI-B	Data In circuit B
4	VCC	Voltage common
5	CI-A	Control In circuit A
6	CI-B	Control In circuit B
7	+5V	+5 volts (from host)
8	+5V	Secondary +5 volts (from host)
9	DO-A	Data Out circuit A
10	DO-B	Data Out circuit B
11	VCC	Secondary voltage common
12	NC	Reserved
13	NC	Reserved
14	FN Pwr	Secondary +12 volts or +5 volts
Shell	Protective Gnd	Protective ground

Connector type: Custom 14-pin .05-inch spaced ribbon

Laser Printers

LaserWriter II NT – Switch 1

	1	2
Communication and command mode		
LocalTalk	**OFF**	**OFF**
Diablo 630 emulation	ON	OFF
9600 Baud RS-232 & RS-422	OFF	ON
1200 Baud RS-232 & RS-422	ON	ON

LaserWriter II NTX – Switch 1

	1	2	3	4	5	6
Communication mode						
LocalTalk†	**OFF**	**OFF**				
1200 baud RS-232 & RS-422	ON	OFF				
9600 baud RS-232 & RS-422	OFF	ON				
9600 baud RS-232	ON	ON				
Command mode						
PostScript batch			**OFF**	**OFF**		
Diablo 630			ON	OFF		
PostScript interactive			OFF	ON		
HP LaserJet			ON	ON		
Handshaking						
X-On/X-Off					**OFF**	**OFF**
X-On/X-Off					ON	ON
ETX/ACK					ON	OFF
Data Set Ready					OFF	ON

† If LocalTalk is selected, switches 3 through 6 are not used.

LaserWriter IIf and IIg – Pushbutton Switch

Port	Switch Setting	Connection Type	Communication
8-pin serial	0-4 5 6 7-9	LocalTalk 9600 baud serial 19200 baud serial LocalTalk	PostScript PostScript PostScript PostScript
25-pin serial	0 or 5 1 2 3 4 6 7 8 9	9600 baud serial 9600 baud serial 19200 baud serial 9600 baud serial 1200 baud serial 19200 baud serial 1200 baud serial 1200 baud serial 9600 baud serial	PostScript HP PCL 4 PostScript Nonprinting input PostScript PostScript PostScript HP PCL 4 PostScript
Ethernet†	0-9	EtherTalk	PostScript

† Ethernet port is available on the LaserWriter IIg only.

Personal LaserWriter LS
Pin-outs – RS-422

Pin	Signal Name	Signal Description
1	CLK	Receive/transmit clock output
2	NC	No connection
3	TxD-	Transmit Data -
4	SG	Signal Ground
5	RxD-	Receive Data -
6	TxD+	Transmit Data +
7	NC	No connection
8	RxD+	Receive Data +

Connector type: Mini DIN-8 male

Personal LaserWriter NT and NTR Pin-outs – RS-422

Pin	Signal Name	Signal Description
1	HSKo	Handshake out
2	HSKi	Handshake in
3	TxD-	Transmit Data -
4	SG	Signal Ground
5	RxD-	Receive Data -
6	TxD+	Transmit Data +
7	GPi	General-Purpose input
8	RxD+	Receive Data +

Connector type: Mini DIN-8 male

Personal LaserWriter NT and NTR Pin-outs – RS-232

Pin	Signal Name	Signal Description
1	SGND	Signal ground
2	TxD	Transmitted Data
3	RxD	Received Data
4	RTS	Request To Send
5	CTS	Clear To Send
6	DSR	Data Set Ready
7	SG	Signal Ground
8	DCD	Data Carrier Detect
20	DTR	Data Terminal Ready
22	RI	Ring Indicator

Connector type: DB-25 male

Personal LaserWriter SC
Pin-outs – SCSI Port

Pin	Signal Name	Signal Description
1-12	GND	Signal ground
13	NC	No connection
14-25	GND	Signal ground
26	DB0/	Data Bit 0
27	DB1/	Data Bit 1
28	DB2/	Data Bit 2
29	DB3/	Data Bit 3
30	DB4/	Data Bit 4
31	DB5/	Data Bit 5
32	DB6/	Data Bit 6
33	DB7/	Data Bit 7
34	DBP/	Data Parity
35-37	GND	Signal ground
38	+5V	+5 volts
39	GND	Signal ground
40	GND	Signal ground
41	ATN/	Attention
42	GND	Signal ground
43	BSY/	Busy
44	ACK/	Acknowledge
45	RST/	Reset
46	MSG/	Message
47	SEL/	Select
48	C/D/	Control/Data
49	REQ/	Request
50	I/O/	Input/Output

Connector type: BR-50 male

Personal LaserWriter NTR
Pin-outs – Parallel Port

Pin	Signal Description
1	Data strobe
2	Data 1
3	Data 2
4	Data 3
5	Data 4
6	Data 5
7	Data 6
8	Data 7
9	Data 8
10	Acknowledge
11	Busy
12	Paper error
13	Select out
14	Autofeed
15	Select in
16	Signal ground
17	Chassis ground
18	No connection
19-30	Signal ground
31	Prime
32	Fault
33-36	No connection

Connector type: TRW CINCH 57-30360 or equivalent

Personal LaserWriter NT – Thumbwheel Switch

Switch Position	Connector	Meaning
0	8-pin 25-pin	AppleTalk, PostScript batch mode Serial, no input
1	8-pin 25-pin	Serial (9600, N, std, 1, XON), Postscript batch mode Serial (9600, N, std, 1, XON), Postscript batch mode
2	8-pin 25-pin	Serial (9600, N, 1, XON), HP emulation Serial (9600, N, 1, XON), HP emulation
3	8-pin 25-pin	Serial (9600, N, 1, XON), Diablo emulation Serial (9600, N, 1, XON), Diablo emulation
4†	8-pin 25-pin	Serial 1200, N, std, 1, XON, PostScript batch mode Serial 1200, N, std, 1, XON, PostScript batch mode
5	8-pin 25-pin	Serial (9600, N), 8, (1, None), Postscript batch mode Serial (9600, N), 8, (1, DTR), Postscript batch mode
6	8-pin 25-pin	Serial (9600, N), 8, (1, XON), Postscript binary mode Serial (9600, N), 8, (1, XON), Postscript binary mode
7	8-pin 25-pin	AppleTalk, PostScript batch Serial, no input

For switch positions 1 through 6, the parameters are listed in the following order: data transfer rate, parity check, number of data bits, stop bits, handshake, and mode. The parentheses indicate that the parameter can be changed via software.

† When the switch is set to position 4 and the printer is turned on, a diagnostic page will be printed instead of the normal startup page.

Laser Printers

LaserWriter and LaserWriter Plus Pin-outs – AppleTalk

Pin	Signal Name	Signal Description
3	SG	Signal Ground
4	TXD+	Transmit Data +
5	TXD-	Transmit Data -
8	RXD+	Receive Data +
9	RXD-	Receive Data -

Connector type: DE-9 male

Mode switch set to "AppleTalk" selects this port.

LaserWriter and LaserWriter Plus Pin-outs – RS-232

Pin	Signal Name	Signal Description
2	TD	Transmit Data
3	RD	Receive Data
4	RTS	Request To Send
7	SG	Signal Ground
20	DTR	Data Terminal Ready

Connector type: DB-25 male

Mode switch set to "1200" or "9600" selects this port.

Non-Laser Printers

StyleWriter Pin-outs

Pin	Signal Name	Signal Description
1	DTR	Data Terminal Ready (output)
2	DSR	Data Set Ready (input)
3	TXD-	Transmit Data (output)
4	SG	Signal Ground
5	RXD-	Receive Data (input)
6	TXD+	Balanced transmit + (output)
7	NC	No connection
8	RXD+	Balanced receive + (input)
(Shield)	PG	Protective Ground

Connector type: Mini DIN-8 male

ImageWriter II and II/L Pin-outs

Pin	Signal Name	Signal Description
1	DTR	Data Terminal Ready (output)
2	DSR	Data Set Ready (input)
3	TXD-	Transmit Data (output)
4	SG	Signal Ground
5	RXD-	Receive Data (input)
6	TXD+	Balanced transmit + (output)
7	NC	No connection
8	RXD+	Balanced receive + (input)
(Shield)	PG	Protective Ground

Connector type: Mini DIN-8 male

ImageWriter II and II/L – Switch 1

	1	2	3	4	5	6	7	8
Character set								
American	**OFF**	**OFF**	**OFF**					
Italian	ON	OFF	OFF					
Danish	OFF	ON	OFF					
British	ON	ON	OFF					
German	OFF	OFF	ON					
Swedish	ON	OFF	ON					
French	OFF	ON	ON					
Spanish	ON	ON	ON					
Form length								
11 inches				**OFF**				
12 inches				ON				
Perforation skip								
Disabled					**OFF**			
Enabled					ON			
Characters per inch								
10						OFF	OFF	
12						**ON**	**OFF**	
17						OFF	ON	
Proportional						ON	ON	
Auto LF on CR								
Disabled								**OFF**
Enabled								ON

Non-Laser Printers

ImageWriter II and II/L – Switch 2

	1	2	3	4	5	6
Baud rate						
300	OFF	OFF				
1200	ON	OFF				
2400	OFF	ON				
9600	**ON**	**ON**				
Handshaking						
Hardware (DTR)			**OFF**			
X-On/X-Off			ON			
Option card						
Not installed				**OFF**		
Installed				ON		
Hammer firing†						
Factory set					xx	xx
Factory set					xx	xx

† Note: These switches modify adjustments critical to print quality. DO NOT change their settings unless you refer to the *ImageWriter II and II/L Technical Procedures* or *Service Source* for additional information.

ImageWriter LQ Pin-outs

Pin	Signal Name	Signal Description
1	DTR DSR	Data Terminal Ready (output) Data Set Ready
2	DSR DTR	Data Set Ready (input) Data Terminal Ready
3	TXD- RxD	Transmit Data - (output) Received Data
4	SG GND	Signal ground Signal ground
5	RXD- TxD	Receive Data - (input) Transmitted Data
6	TXD+ NC	Transmit Data + (output) No connection
7	NC	No connection
8†	RXD+	Receive Data + (input)
(Shield)	PG Shield	Protective ground

Connector type: Mini DIN-8 male

The first set of signal names and descriptions listed applies to RS-422. The second set applies to RS-232.

† Connect pin 8 to ground (pin 4) when connecting the ImageWriter LQ to an RS-232 interface.

ImageWriter LQ – Switch 1

	1	2	3	4	5	6	7	8
Character set								
American	**OFF**	**OFF**	**OFF**					
Italian	ON	OFF	OFF					
Danish	OFF	ON	OFF					
British	ON	ON	OFF					
German	OFF	OFF	ON					
Swedish	ON	OFF	ON					
French	OFF	ON	ON					
Spanish	ON	ON	ON					
Form length								
11 inches				**OFF**				
12 inches				ON				
Perforation skip								
Disabled					**OFF**			
Enabled					ON			
Characters/dots per inch								
10 cpi						OFF	OFF	
12 cpi						**ON**	**OFF**	
17 cpi						OFF	ON	
160 dpi						ON	ON	
216 dpi						ON	ON	
Auto LF on CR								
Disabled								**OFF**
Enabled								ON

Non-Laser Printers

ImageWriter LQ – Switch 2

	1	2	3	4	5	6	7	8
Baud rate								
1200	ON	OFF						
2400	OFF	ON						
9600	ON	ON						
19200	**OFF**	**OFF**						
Handshaking								
Hardware (DTR)			**OFF**					
X-On/X-Off			ON					
Option card								
Not installed				**OFF**				
Installed				ON				
Cut-sheet feeder bins attached								
1					OFF	OFF	ON	
1 and 2					ON	OFF	ON	
1, 2, and 3					OFF	ON	ON	
1 and envelope					**OFF**	**OFF**	**OFF**	
1, 2, and envelope					ON	OFF	OFF	
1, 2, 3, and envelope					ON	ON	OFF	
Auto paper load position								
To print line								**OFF**
To paper bail								ON

Non-Laser Printers

ImageWriter LQ – Switch 3†

	1	2	3	4	5	6	7	8
Not used	XX							
Not used		XX						
Color ribbon home position								
Shift ribbon down								
.78125 mm			ON	ON	OFF			
.46875 mm			OFF	ON	OFF			
.15625 mm			ON	OFF	OFF			
Shift ribbon up								
.78125 mm			ON	ON	ON			
.46875 mm			OFF	ON	ON			
.15625 mm			ON	OFF	ON			
Horizontal registration								
Left movement								
+0.159 mm						ON	ON	OFF
+0.106 mm						OFF	ON	OFF
+0.053 mm						ON	OFF	OFF
+0.000 mm						OFF	OFF	OFF
Right movement								
-0.044 mm						ON	ON	OFF
-0.088 mm						OFF	ON	OFF
-0.132 mm						ON	OFF	OFF
-0.176 mm						OFF	OFF	OFF

† Note: These switches modify adjustments critical to print quality. DO NOT change their settings unless you refer to the *ImageWriter LQ Technical Procedures* for additional information.

ImageWriter and ImageWriter 15-Inch Pin-outs

Pin	Signal Name	Signal Description
1	FG	Frame Ground
2	SD	Send Data (output)
3	RD	Receive Data (input)
4	RTS	Request To Send (output)
7	SG	Signal Ground
14	FAULT/	Fault
20	DTR	Data Terminal Ready (output)

Connector type: DB-25 male

This is an RS-232 interface.

ImageWriter and ImageWriter 15-Inch – Switch 2

	1	2	3	4
Baud rate				
300	OFF	OFF		
1200	ON	OFF		
2400	OFF	ON		
9600	**ON**	**ON**		
Handshaking				
DTR			**OFF**	
X-On/X-Off			ON	
Not used				XX

Non-Laser Printers

ImageWriter and ImageWriter 15-Inch – Switch 1

	1	2	3	4	5	6	7	8
Character set								
American	**OFF**	**OFF**	**OFF**					
British	ON	ON	OFF					
German	OFF	OFF	ON					
French	OFF	ON	ON					
Swedish	ON	OFF	ON					
Italian	ON	OFF	OFF					
Spanish	ON	ON	ON					
Page length								
66 Lines				**OFF**				
72 Lines				ON				
Eighth data bit								
Recognize					**OFF**			
Ignore					ON			
Character pitch								
Pica						OFF	OFF	
Elite						**ON**	**OFF**	
Ultra Condensed						OFF	ON	
Elite Proportional						ON	ON	
Auto LF on CR								
Disabled								**OFF**
Enabled								ON

Non-Laser Printers

Daisy Wheel Printer Pin-outs

Pin	Signal Description	Pin	Signal Description
1	Protective ground	7	Signal ground
2	Transmit data	8	Carrier detect
3	Receive data	9-19	No connection
4	Request to send	20	Data terminal ready
5	Clear to send	21-25	No connection
6	Data set ready		

Connector type: DB-25 male

This is an RS-232 interface.

Daisy Wheel Printer – Inside Front Panel Switch

	1	2	3	4	5	6	7	8
Type pitch								
10 CPI	OFF	OFF						
12 CPI	**ON**	**OFF**						
15 CPI	OFF	ON						
Proportional	ON	ON						
Form length								
3 inches			OFF	OFF	OFF	OFF		
3.5 inches			ON	OFF	OFF	OFF		
4 inches			OFF	ON	OFF	OFF		
5 inches			OFF	OFF	ON	ON		
5.5 inches			ON	ON	OFF	OFF		
6 inches			OFF	OFF	ON	OFF		
7 inches			ON	OFF	ON	OFF		
8 inches			OFF	ON	ON	OFF		
8.5 inches			ON	ON	ON	OFF		
9 inches			ON	OFF	ON	ON		
10 inches			OFF	ON	ON	ON		
11 inches			**OFF**	**OFF**	**OFF**	**ON**		
11.66 inches			ON	OFF	OFF	ON		
12 inches			OFF	ON	OFF	ON		
14 inches			ON	ON	OFF	ON		
16 inches			ON	ON	ON	ON		
Auto LF on CR								
Disabled							**OFF**	
Enabled							ON	
Lines per inch								
6								**OFF**
8								ON

Non-Laser Printers

Daisy Wheel Printer – Rear Panel Switch 1

	1	2	3	4	5	6	7	8
Baud rate								
110	OFF	OFF	OFF					
150	ON	OFF	OFF					
300	OFF	ON	OFF					
600	ON	ON	OFF					
1200	**OFF**	**OFF**	**ON**					
2400	ON	OFF	ON					
4800	OFF	ON	ON					
9600†	**ON**	**ON**	**ON**					
Handshaking								
ETX/ACK & DTR				**OFF**	**OFF**			
X-On/X-Off				ON	OFF			
DTR				OFF	ON			
Modem								
No modem						**ON**		
Modem						OFF		
Parity								
Space							**ON**	**ON**
Mark							OFF	ON
Even							ON	OFF
Odd							OFF	OFF

† Factory setting initially 1200 baud. Changed to 9600 baud when shipped with the Lisa.

Non-Laser Printers

Daisy Wheel Printer – Rear Panel Switch 2

	1	2	3	4	5	6	7	8
Character set								
ASCII Standard	**OFF**	**OFF**	**OFF**	**OFF**				
USA WP	ON	OFF	OFF	OFF				
Italian	OFF	ON	OFF	OFF				
Swedish	ON	ON	OFF	OFF				
English (UK)	OFF	OFF	ON	OFF				
French	ON	OFF	ON	OFF				
German	OFF	ON	ON	OFF				
Spanish	ON	ON	ON	OFF				
Print direction								
Bidirectional					**ON**			
Unidirectional					OFF			
Auto LF on CR								
Disabled						**OFF**		
Enabled						ON		
Duplex								
Full							**OFF**	
Half							ON	
Paper-out condition								
Stop printing								**ON**
Continue printing								OFF

Non-Laser Printers

Scribe Pin-outs

Pin	Signal Name	Signal Description
1	FG	Frame Ground
2	SD	Send Data
3	RD	Receive Data
4	RTS	Request To Send
7	SG	Signal Ground
20	DTR	Data Terminal Ready

Connector type: DB-25 male

This is an RS-232 interface.

Non-Laser Printers

Scribe – Switch 1

	1	2	3	4	5	6	7	8
Character set								
American	**OFF**	**OFF**	**OFF**					
Italian	ON	OFF	OFF					
American	OFF	ON	OFF					
British	ON	ON	OFF					
German	OFF	OFF	ON					
Swedish	ON	OFF	ON					
French	OFF	ON	ON					
Spanish	ON	ON	ON					
Auto LF on CR								
Disabled				**OFF**				
Enabled				ON				
Print intensity								
Darkest					OFF	OFF		
Dark					OFF	ON		
Light					ON	OFF		
Lightest					**ON**	**ON**		
Baud rate								
9600							**OFF**	
1200							ON	
Handshaking								
DTR								**OFF**
X-On/X-Off								ON

Non-Laser Printers

Dot Matrix Printer Pin-outs

Pin	Signal Name	Signal Description
1	DATA STB/	Data strobe
2	DATA1	Data bit 1
3	DATA2	Data bit 2
4	DATA3	Data bit 3
5	DATA4	Data bit 4
6	DATA5	Data bit 5
7	DATA6	Data bit 6
8	DATA7	Data bit 7
9	DATA8	Data bit 8
10	ACK/	Acknowledge
11	INPUT-BUSY	Busy input
12	PE	Paper empty
13	SELECT	On/off-line status
14	OV	Ground
15	NC	No connection
16	OV	Ground
17	CGND	Chassis ground
18	+5V	+5 volts DC
19-29	GND	Twisted pair ground (pins 1-11)
30	GND	Twisted pair ground (pin 31)
31	INPUT-PRIME/	Reset input to printer
32	FAULT/	Error condition
33	OV	Ground
34	NC	No connection
35	NC	No connection
36	INPUT-BUSY	Busy input

Connector type: TRW CINCH 57-30360 or equivalent

Non-Laser Printers

Dot Matrix Printer – Switch 1

	1	2	3	4	5	6	7	8
Character set								
English (US)	**OFF**	**OFF**	**OFF**					
Italian	ON	OFF	OFF					
English (UK)	ON	ON	OFF					
German	OFF	OFF	ON					
Swedish	ON	OFF	ON					
French	OFF	ON	ON					
Spanish	ON	ON	ON					
Lines per page								
66 Lines				**OFF**				
72 Lines				ON				
Remote select								
Disabled					**ON**			
Enabled					OFF			
CR/LF on buffer full								
Enabled						**ON**		
Disabled						OFF		
Print upon receipt of								
CR, LF, VT, US, or FF							**ON**	
CR							OFF	
Auto LF on CR								
Disabled								**OFF**
Enabled								ON

Non-Laser Printers

Dot Matrix Printer – Switch 2

	1	2	3	4	5	6	7	8
Zero								
Unslashed	**OFF**							
Slashed	ON							
Buffer								
Single-line		**ON**						
N-line		OFF						
Not used			XX					
Not used				XX				
Printing								
10 CPI (Pica)					**OFF**			
Proportional (Elite)					ON			
Word length								
7-Bit						**ON**		
8-Bit						OFF		
Power-on status								
Selected							**ON**	
Deselected							OFF	
Printing direction								
Bidirectional								**OFF**
Unidirectional								ON

Non-Laser Printers

Color Plotter Pin-outs

Pin	Signal Name	Signal Description
1	FG	Frame ground
3	Rx	Receive Data (input)
4	+12VDC	+12 volts DC
7	SG	Signal Ground
20	DTR	Data Terminal Ready (output)

Connector type: DB-25 male

This is an RS-232 interface.

Non-Laser Printers

Color Plotter – Switch 1

	1	2	3	4	5	6	7	8
Data length								
7 bit	**ON**							
8 bit	OFF							
Parity								
Parity on		OFF						
Parity off		**ON**						
Odd			ON					
Even			OFF					
Stop bits								
1 bit				OFF	ON			
1.5 bits				ON	OFF			
2 bits				OFF	OFF			
Baud rate								
75						ON	ON	ON
150						ON	ON	OFF
300						ON	OFF	ON
600						ON	OFF	OFF
1200						**OFF**	**ON**	**ON**
2400						OFF	ON	OFF
4800						OFF	OFF	ON
9600						OFF	OFF	OFF

Modems and Communications Devices

Apple Personal Modem Pin-outs

Pin	Signal Name	Signal Description
1	DSR	Data Set Ready (output)
2	DTR	Data Terminal Ready (input)
3	RXD	Receive Data (output)
4	SG	Signal Ground
5	TXD	Transmit Data (input)
6	SG	Signal Ground
7	DCD	Data Carrier Detect (output)
8	NC	No connection

Connector type: Mini DIN-8 male

This is an RS-232 interface.

AppleFax Modem and Apple Data Modem 2400 Pin-outs

Pin	Signal Name	Signal Description
1	HSKo	Handshake (output)
2	HSKi	Handshake (input)
3	TxD-	Transmit data - (output)
4	SG	Signal Ground
5	RxD-	Receive data - (input)
6	TxD+	Transmit data + (output)
7	GPi	Carrier Detect (output)
8	RxD+	Receive data + (input)

Connector type: Mini DIN-8 male

Modems and Communications Devices

Modem 300/1200 Pin-outs

Pin	Signal Name	Signal Description
2	DSR	Data Set Ready
3	SGND	Signal Ground
5	RCD	Receive Data
6	DTR	Data Terminal Ready
7	DCD	Data Carrier Detect
8	GND	Chassis ground
9	TXD	Transmit Data

Connector type: DE-9 male

This is an RS-232 interface.

Modem 300 – Switches

	1	2	3
Carrier detect			
Always high	**ON**		
Normal	OFF		
Not used		XX	
Data terminal ready			
Computer supplies			**OFF**
Modem supplies			ON

Modems and Communications Devices

Modem 1200 – Switches

	1	2	3
Carrier detect			
Always high	**ON**		
Normal	OFF		
PBX/CBX			
Meets Bell standard (212A)		**OFF**	
Doesn't meet Bell standard		ON	
Data terminal ready			
Computer supplies			**OFF**
Modem supplies			ON

AppleLine Pin-outs

Pin	Signal Name	Signal Description
1	SGND	Shield ground
2	TXD	Transmit Data (output)
3	RXD	Receive Data (input)
4	RTS	Request To Send (output)
5	CTS	Clear To Send (input)
6	DSR	Data Set Ready (input)
7	GND	Signal ground
8	DCD	Data Carrier Detect (input)
12	CH	Data signal rate selector (input)
20	DTR	Data Terminal Ready (output)
22	CE	Ring Indicator (input)

Connector type: DB-25 female

This is an RS-232 interface.

Modems and Communications Devices

Cluster Controller Pin-outs – Asynchronous Direct Port

Pin	Signal Name	Signal Description
1	GND	Ground
2	TX	Transmit Data (input)
3	RX	Receive Data (output)
4	RTS	Request To Send (input)
5	CTS	Clear To Send (output)
6	DSR	Data Set Ready (output)
7	GND	Ground
8	DCD	Data Carrier Detect (output)
20	DTR	Data Terminal Ready (input)

Connector type: DB-25 male

This is an RS-232 interface.

Cluster Controller Pin-outs – Modem Port

Pin	Signal Name	Signal Description
1	GND	Ground
2	Tx	Transmit Data (output)
3	Rx	Receive Data (input)
4	RTS	Request To Send (output)
5	CTS	Clear To Send (input)
6	DSR	Data Set Ready (input)
7	GND	Ground
8	DCD	Data Carrier Detect (input)
20	DTR	Data Terminal Ready (output)

Connector type: DB-25 male

This is an RS-232 interface.

AppleColor High-Resolution RGB Monitor Pin-outs

Pin	Signal Description
1	Red video ground
2	Red video
3	Composite TTL sync
4	Sense ID #1 (grounded)
5	Green video
6	Green video ground
7	Sense ID#2 (open)
8	Not used
9	Blue video
10	Sense ID#3 (open)
11	Not used
12	Not used
13	Blue video ground
14	Not used
15	Not used
Shell	Shield ground

Connector type: DA-15 male

CAUTION: The signals on this connector are not the same as on the DA-15 of the Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card. DO NOT connect an Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card device or cable to the monitor.

Macintosh 12-Inch RGB Display Pin-outs

Pin	Signal Description
1	Red video ground
2	Red video
3	Composite TTL sync
4	Sense ID #1 (grounded)
5	Green video
6	Green video ground
7	Sense ID#2 (open)
8	Not used
9	Blue video
10	Sense ID#3 (grounded)
11	Not used
12	Not used
13	Blue video ground
14	Not used
15	Not used
Shell	Shield ground

Connector type: DA-15 male

CAUTION: The signals on this connector are not the same as on the DA-15 of the Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card. DO NOT connect an Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card device or cable to the monitor.

Apple High-Resolution Monochrome Monitor Pin-outs

Pin	Signal Description
1	Not used
2	Not used
3	Composite TTL sync
4	Composite sync ground
5	Black and white video
6	Video ground
7	Not used
8	Not used
9	Not used
10	Not used
11	Not used
12	Not used
13	Not used
14	Not used
15	Not used
Shell	Shield ground

Connector type: DA-15 male

CAUTION: The signals on this connector are not the same as on the DA-15 of the Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card. DO NOT connect an Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card device or cable to the monitor.

Macintosh 12-Inch Monochrome Monitor Pin-outs

Pin	Signal Description
1	Not used
2	Not used
3	Composite TTL sync
4	Sense ID#1 (grounded)
5	Black and white video
6	Video ground
7	Sense ID#2 (open)
8	Not used
9	Not used
10	Sense ID#3 (open)
11	Composite sync return
12	Not used
13	Not used
14	Not used
15	Not used
Shell	Shield ground

Connector type: DA-15 male

CAUTION: The signals on this connector are not the same as on the DA-15 of the Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card. DO NOT connect an Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card device or cable to the monitor.

Apple Macintosh 21-Inch Color Display Pin-outs

Pin	Signal Description
A1	Blue video
A2	Green video
A3	Red video
1	Horizontal sync return
2	Vertical sync
3	Sense ID #3
4	Sense ground
5	Composite sync
6	Horizontal sync
7	Vertical sync return
8	Sense ID #2
9	Sense ID #1
10	Composite sync return
Shell	Shell Ground

Connector type: 13-pin, mixed-contact, D-type male (Dartech FM-13W3S or equivalent)

Apple Macintosh Portrait Display and Apple Two-Page Monochrome Monitor Pin-outs

Pin	Signal Description
A1	Monochrome video
A2	75-ohm
A3	75-ohm
1	Horizontal sync return
2	Vertical sync
3	Sense ID #3
4	Sense ground
5	Composite sync (not used)
6	Horizontal sync
7	Vertical sync return
8	Sense ID #2
9	Sense ID #1
10	Composite sync return (not used)
Shell	Shell Ground

Connector type: 13-pin, mixed-contact, D-type male (Dartech FM-13W3S or equivalent)

AppleColor RGB and ColorMonitor 100 Pin-outs

Pin	Signal Description
1	Red video ground
2	Red composite video
3	Composite sync
4	Not used
5	Green composite video
6	Green video ground
7	Not used
8	Not used
9	Blue composite video
10	Not used
11	Not used
12	Not used
13	Blue video ground
14	Not used
15	Not used
Shell	Shield ground

Connector type: DA-15 male

CAUTION: The signals on this connector are not the same as on the DA-15 of the Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card. DO NOT connect an Apple IIc, IIGS, III, III Plus, or EtherTalk Interface Card device or cable to the monitor.

Apple Scanner, OneScanner, CD SC, CD SC Plus, HD SC, and Tape Backup 40 SC Pin-outs

Pin	Signal Name	Signal Description
1-12	GND	Signal Ground
13	NC	No connection
14-25	GND	Signal Ground
26	DB0/	Data Bit 0
27	DB1/	Data Bit 1
28	DB2/	Data Bit 2
29	DB3/	Data Bit 3
30	DB4/	Data Bit 4
31	DB5/	Data Bit 5
32	DB6/	Data Bit 6
33	DB7/	Data Bit 7
34	DBP/	Data Parity
35-37	GND	Signal Ground
38	+5V	+5 volts
39	GND	Signal Ground
40	GND	Signal Ground
41	ATN/	Attention
42	GND	Signal Ground
43	BSY/	Busy
44	ACK/	Acknowledge
45	RST/	Reset
46	MSG/	Message
47	SEL/	Select
48	C/D/	Control/Data
49	REQ/	Request
50	I/O/	Input/Output

Connector type: BR-50 male

Apple MIDI Interface Pin-outs

Pin	Signal Description
MIDI IN	
1	No connection
2	Shield ground
3	No connection
4	Interface enable
5	Data in
MIDI OUT	
1	No connection
2	Shield ground
3	No connection
4	+5 volts
5	Data out

Connector type: DIN-5 male

Cables

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Cables

Cables

Introduction

This section contains information about pin connections, colors, and connector types for Apple peripheral cables. A list shows the computers and peripherals appropriate to each cable. Marketing part numbers are indicated for cables available through Apple sales. The illustrations at the end of the section show the pin numbering of each connector.

Notes:
The connector diagrams indicate the pin numbering on the male connector—the connector at the end of the cable, not on the computer or peripheral.

Serial Cables

590-0029

DB-25 Male	DB-25 Female
1	1
2	3
3	2
4 and 5	8
6	20
7	7
8	4 and 5
20	6

Color: light gray

This is a modem eliminator cable, used to connect the Apple III, III Plus, or Lisa/Macintosh XL to serial ports on devices other than modems.

This cable has been replaced by 590-0166.

590-0037

DB-25 Male	DB-25 Male
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
20	20

Color: light gray

Used to connect the following devices:

Using a Super Serial Card: Apple II, II Plus, IIe, or IIGS to an AppleLine, Color Plotter, ImageWriter/ImageWriter 15-inch, Scribe, Daisy Wheel Printer, or Cluster Controller.

Apple IIGS or IIc Plus to an ImageWriter/ImageWriter 15-inch, Scribe, Daisy Wheel Printer, Color Plotter, or Cluster Controller. Also requires cable 590-0550.

Apple III, III Plus, or Lisa/Macintosh XL to an ImageWriter/ImageWriter 15-inch, Scribe, Daisy Wheel Printer, AppleLine, or Color Plotter. Also requires cable 590-0166.

Apple III, III Plus, or Lisa/Macintosh XL to a Cluster Controller.

Serial Cables

590-0121

DB-25 Male	DE-9 Male
1	8
2	9
3	5
5 and 8	7
6	2
7	3
20	6

Color: beige

Used to connect the following devices:

Using a Super Serial Card: Apple II, II Plus, IIe, or IIGS to a Modem 300 or Modem 1200.

Apple IIGS or IIc Plus to a Modem 300 or Modem 1200. Also requires cable 590-0550.

Apple III or III Plus to a Modem 300 or Modem 1200.

Lisa/Macintosh XL to a Modem 300 or Modem 1200.

590-0166

DB-25 Male	DB-25 Female
1	1
2	3
3	2
4 and 5	8
6	20
7	7
8	4 and 5
20	6

Color: gray

This is a modem eliminator cable, used with 590-0037 to connect the Apple III, III Plus, or Lisa/Macintosh XL to serial ports on devices other than modems.

This cable replaces 590-0029.

Serial Cables

590-0169

DE-9 Male	DB-25 Male
1	1
3 and 8	7
5	3
7	20
9	2

Color: medium brown

The marketing part number is M0150.

Used to connect the following devices:

Apple IIGS or IIc Plus to a Scribe, ImageWriter/ImageWriter 15-Inch, or Color Plotter. Also requires cable 590-0341.

Macintosh 128K, 512K, or 512K enhanced to an AppleLine, ImageWriter/ImageWriter 15-Inch, or Cluster Controller.

Macintosh Plus or later Macintosh to an ImageWriter/ImageWriter 15-Inch, AppleLine, or Cluster Controller. Also requires cable 590-0341 or 590-0553/699-0430.

590-0191

DIN-5 Male	DB-25 Male
1	6
2	3
3	7
4	2
5	20

Color: beige

Used to connect the following devices:

Apple IIc to a Daisy Wheel Printer, Scribe, ImageWriter/ImageWriter 15-Inch, Color Plotter, or AppleLine.

590-0192

DIN-5 Male	DE-9 Male
1	6
2	9
3	3
4	5
5	2
Shield	8

Color: beige

The marketing part number is A2C4505.

Used to connect the following devices:

Apple IIc to a Modem 300 or Modem 1200.

Serial Cables

590-0197

DE-9 Male	DE-9 Male
3 and 8	3 and 8
5	9
6	6
7	7
9	5

Color: medium brown

The marketing part number is M0170.

Used to connect the following devices:

Macintosh 128K, 512K, or 512K enhanced to a Modem 300 or Modem 1200.

Macintosh Plus or later Macintosh to a Modem 300 or 1200. Also requires cable 590-0341 or 590-0553.

590-0550

Mini DIN-8 Male	DB-25 Female
1	6
2	20
3	3
4 and 8	7
5	2
7	4 and 5
Shield	Shield

Color: smoke

The marketing part number is A9M0333.

Apple IIGS and IIc Plus Peripheral Adapter Cable. Used to connect DB-25 cables to the Mini DIN-8 ports.

Serial Cables

590-0551 and 590-0332

Mini DIN-8 Male	DE-9 Male
1 and 7	7
2	6
3	9
4	1
5	5
6	8
8	4

Color:
590-0551—smoke
590-0332—beige

The marketing part number is M0196.

Used to connect the following devices:

Macintosh 128K, 512K, 512K enhanced to an ImageWriter II/IIL, ImageWriter LQ, Apple Personal Modem, or Apple Data Modem 2400.

590-0552 and 590-0340

Mini DIN-8 Male	Mini DIN-8 Male
1	2
2	1
3	5
4	4
5	3
6	8
7	7
8	6

Color:
590-0552—smoke
590-0340—beige

The marketing part number is M0197.

Used to connect the following devices:

Apple IIGS or IIc Plus to an ImageWriter II/IIL, ImageWriter LQ, Apple Personal Modem, or Apple Data Modem 2400.

Macintosh Plus or later Macintosh to an ImageWriter II/IIL, ImageWriter LQ, StyleWriter, Apple Personal Modem, Apple Data Modem 2400, or AppleFax modem.

Serial Cables

590-0553, 699-0430, and 590-0341

Mini DIN-8 Male	DE-9 Female
1	6
2	7
3	5
4	3 and 1
5	9
6	4
8	8

Color:
590-0553 and 699-0430—smoke
590-0341—beige

The marketing part number is M0199. Part number 699-0430 is available from service only.

This adapter cable is used to connect DE-9 cables to devices with Mini DIN-8 ports.

590-0554 and 590-0333

DIN-5 Male	Mini DIN-8 Male
1	2
2	5
3	4 and 8
4	3

Color:
590-0554—smoke
590-0333—beige

The marketing part number is A2C4313.

Used to connect the following devices:

Apple IIc to an ImageWriter II/IIL, ImageWriter LQ, Apple Personal Modem, or Apple Data Modem 2400.

Serial Cables

590-0555 and 590-0331

Mini DIN-8 Male	DB-25 Male
1	6 and 8
2	20
3	3
4 and 8	7
5	2

Color:
590-0555—smoke
590-0331—beige

The marketing part number is A2C0312.

Used to connect the following devices:

Using a Super Serial Card: Apple II, II Plus, IIe, or IIGS to an Apple Data Modem 2400, Apple Personal Modem, ImageWriter II/IIL, or ImageWriter LQ.

Apple III or III Plus to an ImageWriter II/IIL, ImageWriter LQ, Apple Personal Modem, or Apple Data Modem 2400.

Lisa/Macintosh XL to an ImageWriter II/IIL, ImageWriter LQ, Apple Personal Modem, or Apple Data Modem 2400.

Macintosh Plus or later to an ImageWriter/ImageWriter 15-Inch.

This cable can also be used to connect the Apple IIGS, IIc Plus, Macintosh Plus, or later Macintosh computers to third-party serial printers using a DB-25 connector.

590-0556 and 590-0335

DB-25 Male	Mini DIN-8 Male
2	3
3	5
6 and 8	2
7	4 and 8
20	1

Color:
590-0556—smoke
590-0335—beige

The marketing part number is A2C0314.

Used to connect the following devices:

Using a Super Serial Card: Apple II, II Plus, IIe, or IIGS to an ImageWriter II/IIL, ImageWriter LQ, Apple Personal Modem, or Apple Data Modem 2400.

Video Cables

590-4161 and 590-0161

DB-15	DB-15
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
Shell	Shell

Color: smoke

Used to connect the following devices:

Macintosh II video cards or built-in video ports with DB-15 connectors to the AppleColor High-Resolution RGB Monitor, Macintosh 12-Inch RGB Display, Macintosh 12-Inch Monochrome Monitor, or Apple High-Resolution Monochrome Monitor.

Cable 590-4161 replaces cable 590-0161.

590-0615

DA-15 Male	13-pin, male mixed-contact D-connector
1	A1 (outer)
2	A3 (center)
3	5
4	9
5	A2 (center)
6	A2 (outer)
7	8
9	A1 (center)
10	3
11	4, 7, and 10
12	2
13	A3 (outer)
14	1
15	6
Shell	Shell

Color: smoke

Used to connect the following devices:

Macintosh IIci, IIsi, Duo Dock, or Duo MiniDock to an Apple Macintosh Portrait Display.

Macintosh Quadra 700, 900, or 950 to a Portrait Display, Apple Two-Page Mono Monitor, or 21-Inch Color Display.

Portrait Display (newer version) or Apple Two-Page Mono Monitor video card to a Portrait Display Monitor or Apple Two-Page Mono Monitor.

Display Card 4•8, 8•24, or 8•24GC to a Portrait Display Monitor, Apple Two-Page Mono Monitor, or 21-Inch Color Display.

Cables

Video Cables

590-0562

13-pin, mixed-contact D-connector	13-pin, mixed-contact D-connector
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
A3 (center)	A3 (center)
A3 (outer)	A3 (outer)
A2 (center)	A2 (center)
A2 (outer)	A2 (outer)
A1 (center)	A1 (center)
A1 (outer)	A1 (outer)
Shell	Shell

Color: smoke

Used to connect the following devices:

Apple Two-Page Monochrome Monitor video card (obsolete version) to Apple Two-Page Monochrome Monitor.

590-0574

13-pin, mixed-contact D-connector	13-pin, mixed-contact D-connector
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
A1 (center)	A1 (center)
A1 (outer)	A1 (outer)
Shell	Shell

Color: smoke

Used to connect the following devices:

Apple Macintosh Portrait Display or Apple Two-Page Monochrome Monitor video cards (obsolete versions) to the Apple Macintosh Portrait Display Monitor or Apple Two-Page Monochrome Monitor.

SCSI Cables

658-8031 and 590-0345
(Pins 1 - 19)

DB-25 Male	BR-50 Male
1	49
2	46
3	50
4	45
5	44
6	43
7	16, 18, and 19
8	26
9	20, 21, and 22
10	29
11	31
12	32
13	33
14	1, 2, and 3
15	48
16	4, 5, and 6
17	41
18	7, 8, 9, and 11
19	47

658-8031 and 590-0345
(Pins 20 - 25)

DB-25 Male	BR-50 Male
20	34
21	27
22	28
23	30
24	23, 24, and 25
25	38

Color:
658-8031—smoke
590-0345—beige

Used to connect Apple II or Macintosh computers having a SCSI interface to SCSI peripherals.

Compatible computers:
- Apple IIe or IIGS with an Apple II SCSI Interface Card or High Speed SCSI Interface Card
- All Macintosh computers except the 128K, 512K, 512K enhanced, and PowerBook series

Compatible peripherals:
- Hard Disk SC
- Tape Backup 40SC
- AppleCD SC and AppleCD SC Plus
- LaserWriter II SC
- Personal LaserWriter SC
- Apple Scanner and OneScanner

Cables

SCSI Cables

658-8033 and 590-0347

This cable is wired straight through (1 to 1, 2 to 2, 3 to 3, etc.).

Pins 10, 12-15, 17, 35-37, 39, 40, and 42 are not connected.

Color
658-8033—smoke
590-0347—beige

Used to extend the length of SCSI cables (male to female).

658-8034 and 590-0346

This cable is wired straight through (1 to 1, 2 to 2, 3 to 3, etc.).

Pins 10, 12-15, 17, 35-37, 39, 40, and 42 are not connected.

Color:
658-8034—smoke
590-0346—beige

Used to daisy-chain SCSI devices (male to male).

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